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The Mining Journal

LONDON, NOVEMBER 7, 1958

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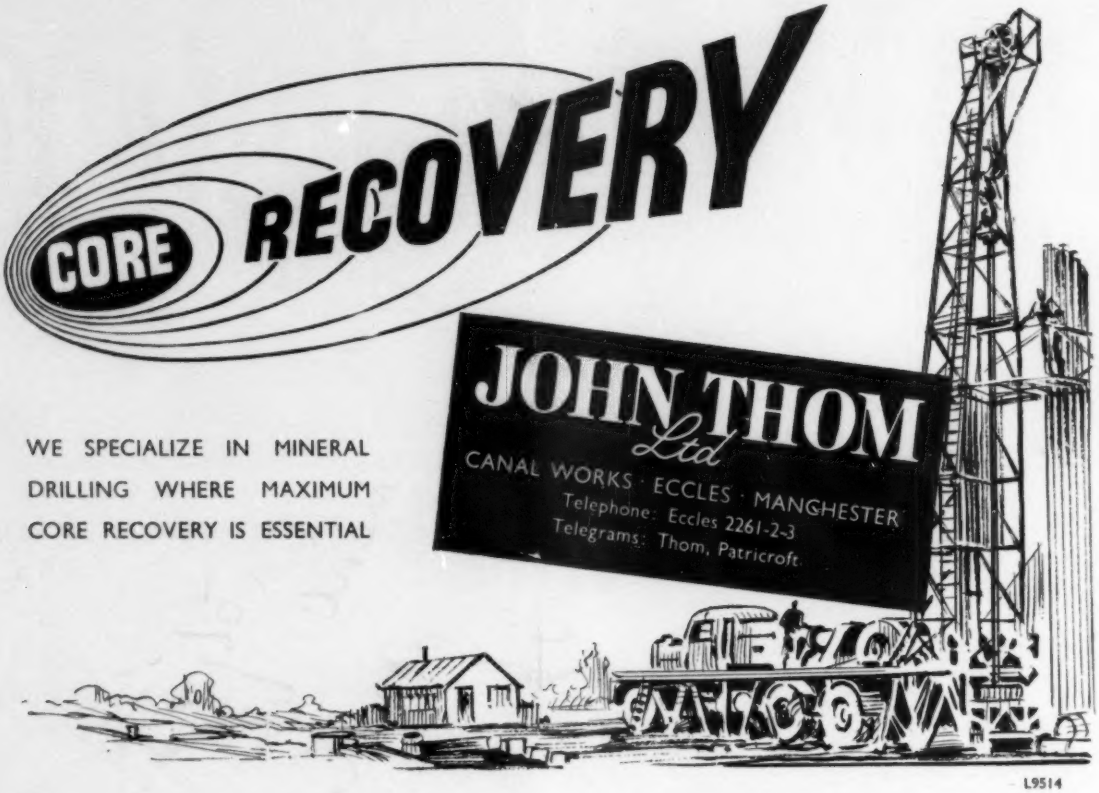

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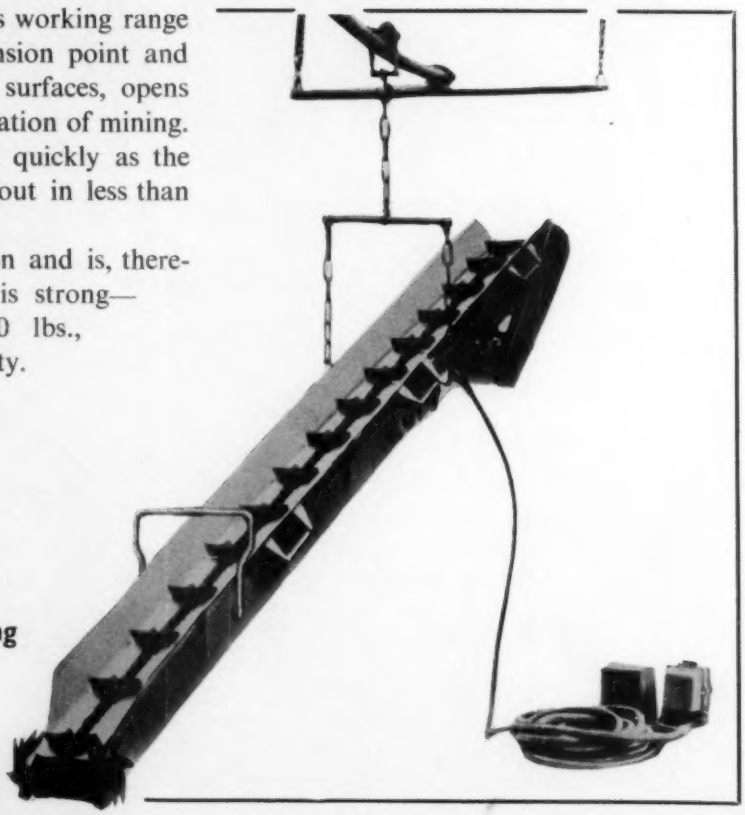

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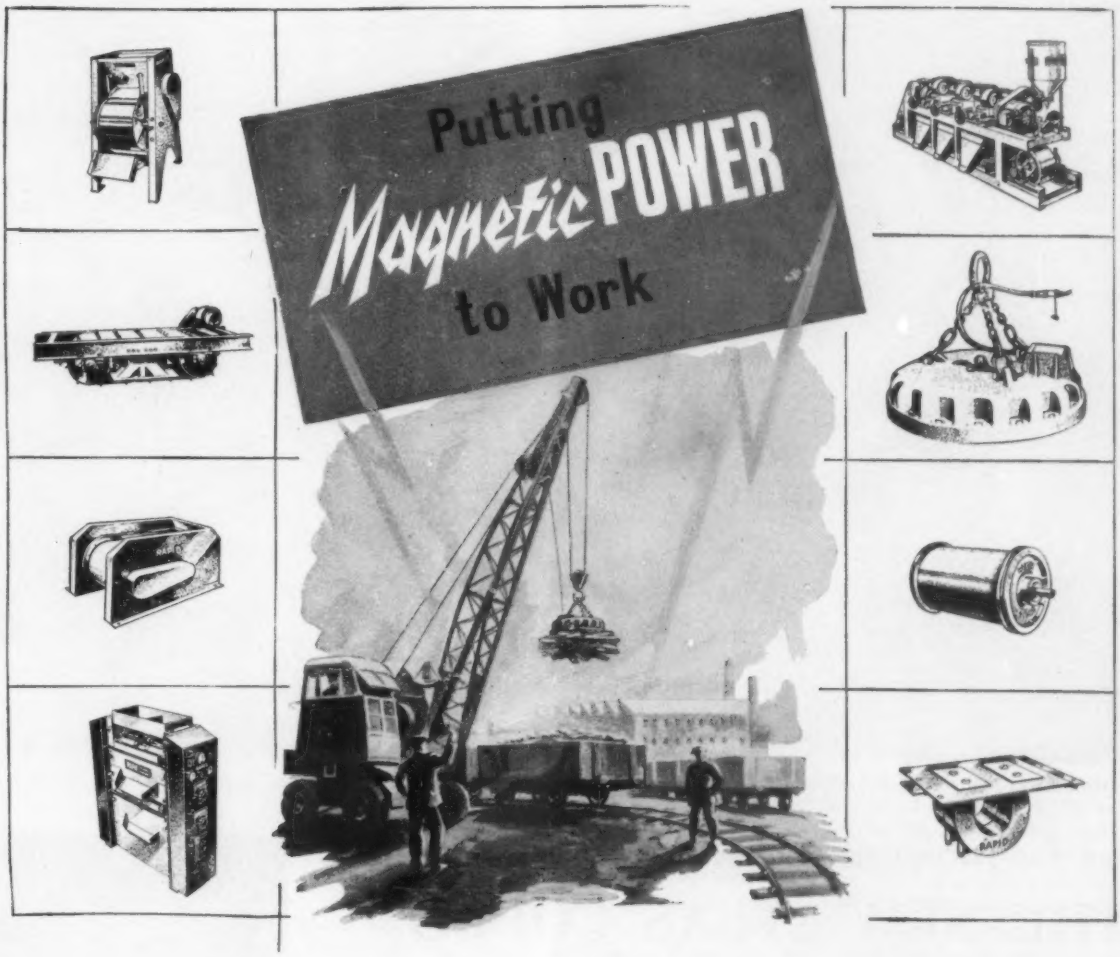

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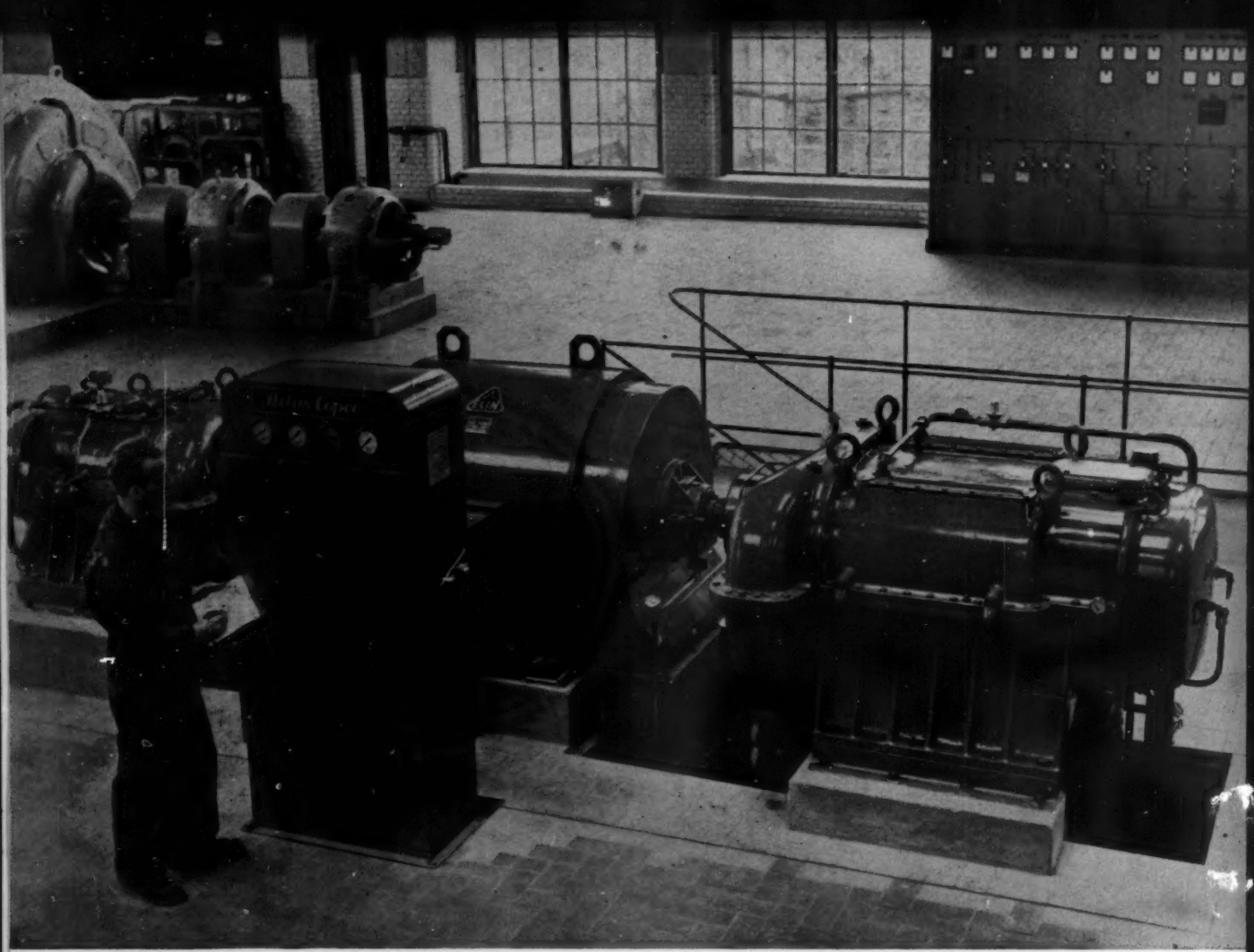

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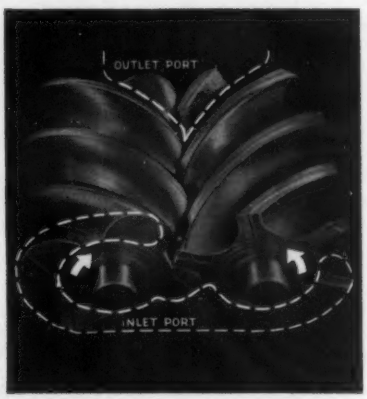

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The Mining Journal

London, November 7, 1958

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Editor
U. Baliol Scott

Deputy Editor
A. Graham Thomson

Assistant Editor
R. Bowran

Assistant Financial Editor
R. A. Nuttall

Display Advertisement Manager
E. S. Hooper

Circulation
Robert Budd

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Directors

E. Baliol Scott (*Chairman*)
U. Baliol Scott (*Managing*)
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Back to Work on the Copperbelt

THE strike is over, but the issue is still open. That, perhaps, best sums up the current situation on the Copperbelt. What was it all about? Why did the men feel so deeply about it as to strike for 53 days, bringing many of them to the verge of hardship? Where does it leave the Federation?

Negotiations on the ending of certain restrictive practices began in January of this year and first ended in deadlock on April 3. The companies then announced their intention of putting their proposals into effect on May 1 and this brought a fresh bout of discussions ending April 29 with complete agreement in principle but with certain details of incidental duties to be left for further examination.

It was out of this "further examination" that the dispute arose. Negotiations continued fitfully over 38 jobs which seemed to be stumbling blocks; although another difficulty was how the disputed jobs should be carried out pending the conclusion of the talks. Discussions reduced the number of disputed jobs to 22 before they finally foundered and, on September 12, the strike began.

Subsequently, the Chamber of Mines took the almost unprecedented step of agreeing to renew negotiations without first insisting that the strikers should return to their duties—a remarkable testimony to its desire to see the dispute resolved. The outcome of these further talks was that the number of jobs still in dispute was cut down to 11, and again there was a failure to reach full agreement. The next attempt was to try to get the men back to work and pick up the discussions thereafter. This was agreed between the union leaders and the Chamber of Mines but, surprisingly, on November 1, the rank and file voted by a very big majority not to accept the terms. Now, after more high level talks and interventions, the men have accepted pretty well what they overwhelmingly rejected less than a week ago.

It is difficult to see what can have achieved this sudden about-turn, unless the explanation lies in a provision of the agreement to return to work whereby the Governor of Northern Rhodesia will call both sides together within seven days from the resumption of work to review the dispute procedure clauses of the union's recognition agreement with the companies and to decide on any necessary amendments.

What precisely this means in practice is obscure as it would certainly be surprising if machinery for negotiating the revision of existing procedures were not already part of the existing agreement. No doubt the unions would like to see a compulsory arbitration clause written into their agreement and in particular to get the companies to agree to let the present dispute go to compulsory arbitration. It would, however, be surprising if the Chamber were to agree to compulsory arbitration on any matter so closely affecting the technical performance of the job.

Under the agreement to resume work the Chamber and the union are to meet forthwith under the chairmanship of Colonel Gauron, presumably at the point where negotiations were last broken off when the union refused to hear the chairman's

conclusions on the grounds that this might prejudice subsequent arbitration proceedings. The fact that the union has apparently now agreed to hear these conclusions, coupled with the provisions for subsequent talks on dispute procedure, suggests the possibility that both sides have tacitly agreed to accept the chairman's findings without prejudice to their respective positions on compulsory arbitration.

Throughout this dispute, there seems little doubt that at rock bottom the men feared that somehow the issue of economic efficiency was getting mixed up with that of African Advancement. On the one hand this is the opinion of some well-qualified to know the men's minds. On the other, there are negative indications to bear it out. On September 25, the Chamber of Mines put out a statement denying that there was any connexion between demarcation and advancement and criticizing a junior Federal Minister for having "seen fit to give currency to a mischievous rumour of this description". Doubtless, there was no connexion either in intention or in actual negotiation—but the point is, did the men think (however mistakenly) that there was?

The second negative indication is that the Chamber also denied that there was any truth in the rumour that the union might sign a separate agreement with the Anglo American group. Again we have no reason to doubt that the Chamber's statement was correct, but the very fact that it had to be issued may give a pointer to the way the men's minds were working. Before a common programme for African Advancement was agreed in the Chamber in 1955, the Anglo American group was inclined to approach the issue more gradually than was the R.S.T. group. That difference of approach is now past history; what then caused the men, or some of them, to dredge it up again?

It seems that somehow the Chamber has failed to reassure the men that demarcation and advancement are unconnected. In the modern jargon it is a failure of communications. No blame attaches to the Chamber for that. But before the men's thinking can be changed there has to be a frank recognition of what the state of their minds is, or, at least, was. If, for example, they regard the downgrading of certain jobs as paving the way for the Africanization of job categories, which they intend in any case to oppose at a later stage, the fact had best be faced now.

How does all this affect the Federation? It was interesting to see Sir Roy Welensky's exercise in brinkmanship; having discussions with both sides in the dispute in a manner that fell short of the intervention that the Constitution forbids him to make. Will this provide some sort of precedent on the limits to which Federal interest in labour affairs can be legitimately expressed? Or was Sir Roy prompted primarily by the desire to see the matter cleared up before next week's Federal elections?

Those who suggest that the strike was being kept alive till then in the interests of the Dominion Party are surely mistaken. Nobody thought that the strike would last as long as it did. It was never on the cards that it could have been dragged on so much longer for purely political ends. Nevertheless, the strike may have its effects on the elections as its memory will be fresh.

Indeed, it could be that the 11 jobs will still be under discussion when voting starts, as the outstanding ones are clearly those on which it is most difficult to get agreement.

It looks, therefore, as if the issue will still be alive on November 12. To the extent that the men have been worried by racial issues, to that extent they may be expected to throw in their lot with the Dominion Party which is much more cautious in its racial ideas than the party of Sir Roy Welensky. However, all this is scarcely likely to do more than have an influence on the size of the government majority. The outcome of the next British elections is likely to be far more crucial for the future evolution of the Federation.

The implications for the copper market of the production lost during the strike are discussed by our Metal Exchange correspondent on page 512.

GEOLOGICAL EXPLORATION IN THE SOLOMONS

The economy of the Solomon Islands Protectorate is almost entirely dependent on the production of copra, a commodity whose world price is falling. Annual grants in aid are also received from the British Government. The benefits to be derived from the establishment of a second industry are fully appreciated and the Protectorate Government is, therefore, endeavouring to stimulate the development of mineral resources by a policy of encouragement to bona fide prospectors and mine operators.

The main reason for stagnation during the post-war decade was that mining companies and individuals could not be assured of rights to mine their discoveries under the terms of the Regulations, as they then stood. In order to provide more favourable conditions the high royalty rates introduced in 1952 have been abolished, the Mining Regulations have been amended, and the Radio-Active Minerals Rules of 1948 have been rescinded. This has brought the regulations into line with those of the more enlightened countries where mining is established.

The changes in mining policy were reflected in 1956 by a resurgence of prospecting activity on Guadalcanal. The Gold Ridge mining field, in the centre of the island, was again the focal point of attention, this time by a mining company prospecting as a follow-up to the Geological Survey's discoveries of three flat-lying gold-bearing bodies in 1955.

This is one of the more important developments described by John C. Grover in a comprehensive and well-illustrated review of geological exploration and research in the period 1953-56, which has been published by the Geological Survey of the British Solomon Islands as Memoir No. 2 (obtainable from the Crown Agents for Oversea Governments and Administrations, 4 Millbank, London, S.W.1, price £2). Besides chronicling activities and developments during this period, the book contains sections devoted to the structure of the region and to the geology and mineral deposits of individual islands.

The Survey's three-geologist team has undertaken systematic regional surveys on major islands. On some only portions have been mapped, but it is considered more important at present that the knowledge gained be regional rather than pertaining to one locality only. This fundamental mapping is regarded as being not only the scientific approach, but also the one likely to produce the best economic results in the long run. The view is wisely taken that it is far better for the Survey to be in a position to point out a number of unprospected mineral-bearing areas to interested mining men, who are capable of doing the detailed work, than to expend all its energies on prospecting one or two likely places in detail—probably disproving them—and failing to find others.

These regional surveys have led to discoveries of mineralized areas which would not otherwise have been brought to light, and which had been missed by earlier rapid reconnaissance surveys. Instead of extending the knowledge of known mineral-bearing fields, new likely ones are being found. The regional picture on Guadalcanal has proved particularly interesting as regards economic mineralization, but much remains to be done. In the

light of data now available, it seems difficult for a mining man to remain oblivious of the possibilities that exist at Gold Ridge.

The absence of prospecting activity until 1956 had the favourable effect of leaving the Survey more or less free to concentrate on the fundamental work. In 1954, however, some laterite cappings of ultrabasic rock areas were bored and tested for nickel, chromite and cobalt concentrations; a magnetite deposit found in Western Guadalcanal was briefly examined and is believed to hold prospects of copper sulphide concentration at depth. In 1956 the tempo increased considerably : a pyrite deposit at the Tina River headwaters was examined immediately after its discovery; a phosphate deposit was discovered on remote Bellona Island and other phosphate indications were noted on Rennell; alluvial ilmenite was found over a wide area on Malaita, and interest was aroused by the discovery and subsequent research on chromite beach sands found on Santa Ysabel. Beach sands from Guadalcanal are being studied.

The need for geophysical aids in the future search for concealed concentrations of minerals has been anticipated and discussed. From the wider viewpoint the need for a submarine gravity survey of the Solomons and New Hebrides regions has been considered. Official representations have been made for the use of a submarine for this venture. Subsequently, it is hoped that detailed gravity measurements can be made along shorelines by a ground party, thereby consolidating the geological work and supplementing the submarine work. The better understanding of the broad and important structural features of the region gained from this and associated work might be sufficient basis for an opinion as to whether it is worthwhile instituting a search for nickel, chromite and kindred minerals in Malekula and Espiritu Santo, the only two large unexplored islands that are included in the New Hebrides Condominium.

The work so far accomplished indicates that the Protectorate undoubtedly has some very interesting economic mineral possibilities.

R.S.M. ASSOCIATION LOOKS AT EDUCATION

The 74th Annual Dinner of the Royal School of Mines Association, held last Tuesday at the Apothecaries' Hall, London, under the chairmanship of this year's President, Mr. A. F. Radcliffe, once again proved to be the most urbanely relaxed event on the British mining calendar. It proved also to be an occasion to stimulate some serious thinking.

In proposing the toast of the R.S.M. Association, Mr. A. Chester Beatty ably outlined the now familiar growth pattern which we must expect in mining. He assured his audience that their's was a vital industry of which the future was most soundly based—provided that enough trained young men were forthcoming to staff it.

The President, in responding, gave cheering news of the expanding intake into the R.S.M., which was currently at a rate equivalent to the entire strength of the School in the years between the wars. Quantity, the President went on to suggest, was all very well but what about quality? The elimination of the intermediate year, in the School's syllabus had meant, as in so many similar cases, forcing back on to the Sixth Forms of secondary schools a degree of specialization for which the pupil was ill-prepared. Education in the true sense was now stopping at 15, for the graduate no less than for the apprentice.

It was left to Sir Harold Bishop, responding in his capacity as President of the Old Centralians to the toast of the Guests, to offer a solution, at least in the context of the Imperial College. It was his view that the undergraduate engineer must be prevented from becoming too specialized. The challenge for the College was by what means to provide a broader educational background for the graduate engineer.

While accepting this as a desirable aim we would suggest in all seriousness that first things must come first. What, we wonder, is the use of providing a broader educational background for an undergraduate whose intellectual and cultural instincts have already been atrophied by two years of Sixth Form specialization in science subjects which have taxed the memory, rather than stimulated the agility of the mind. The universities do not want devoted note-takers, they want boys who ask questions.

We can turn out lab boys without the expense of a university education. The trouble seems to be that too many of them are coming to the university. How can we filter our lab boys at the "O" level and then continue a broader education in the Sixth Form?

To learn more and more about less and less leads eventually to such a degree of *déformation professionelle* that the lopsided end-product is in danger of being quite unequipped to apply his specialization in the realities of the wider world in which he must work. The real antidote is for him to discover just what is the minimum that any young man needs to learn about most things in order to live intelligently, and beyond that to memorize his information sources against the day when he needs to know that much more about any one segment of his world.

COAL SITUATION WORSENS

In Western Germany more pits have been compelled to introduce "holiday shifts" and there are now very few—if any—collieries in the Ruhr working on full time. These enforced idle shifts have so far this year resulted in a loss of production of more than 2,000,000 tons. Despite this cutting back of production, coal and coke stocks in the Federal Republic now top 11,000,000 tons. Apart from that of Belgium the coal industry of West Germany is the hardest hit of the Pool countries. It is believed that these two countries are seeking financial help from the High Authority to aid the producers until demand for coal picks up again.

In Britain, too, the mountains of coal stocked around the pitheads are assuming formidable proportions. Including some 19,000,000 tons distributed stocks there are now 34,000,000 tons of coal currently held in the U.K. Despite the fact that production of deep-mined coal is 3 per cent down on last year's figure, consumption has dropped by 5 per cent and unsold coal held by the National Coal Board represents the sterilizing of some £70,000,000 of capital. There has been a demand from many quarters that opencast coal operations—which at the present time are both productive and profitable—be drastically curtailed in order that the surplus coal can be disposed of. If, however, any closure of a coal producing unit is ultimately necessary, it would appear sound economics to jettison those mines operating at a loss rather than units showing a profit, bearing in mind that wholesale closures are out of the question. Even the current high stocks still represent something under 7 per cent of the national output. There is, of course, the argument that it is easier to reopen an opencast mine after prolonged closure than to get a deep mine into production again. The validity of this argument is conditioned by many factors other than environmental.

Alongside, at left, the Algom Quirke property. Below, on this page, is the Lacnor mine of Northspan Uranium.

The Story of Elliot Lake

Through the courtesy of the Rio Tinto Mining Co. Ltd. of Canada and the Toronto Stock Exchange, the Deputy-Editor of *The Mining Journal* had an opportunity of visiting the Elliot Lake District of Ontario. This article sketches the development of the world's largest uranium camp, commonly known as Blind River. A second article will give impressions of the mines and mills visited and of Elliot Lake City as it is today.

CANADIAN production of uranium oxide amounted last year to 6,687 tons and is expected to reach its full scheduled rate of 15,000 tons annually by the end of 1958. The Dominion's reserves of uranium ore now stand at 334,100,000 tons of ore containing 345,000 tons of uranium oxide, of which no fewer than 320,000,000 tons are contained in the Algoma Basin, situated in the Elliot Lake district of northern Ontario, to the north of Lake Huron.

Six years ago what is now Canada's busiest mining field, with a population already exceeding 25,000, was a sparsely inhabited region of lakes, forests, muskeg and rockland, which one time had a prosperous lumbering industry. The name Blind River by which it is commonly known is derived from a town on the Trans-Canada Highway some ten miles distant.

Because of its relatively easy accessibility the area has been known to prospectors for many years and there have been a number of searches for minerals other than uranium. Radioactive indications were first noted in 1948 and led to a revival of interest but the outcrop when tested contained no uranium. The signs of radioactivity were ascribed by some engineers to the presence of thorium, which at that time was a worthless mineral. One man who refused to be discouraged was Franc Joubin, a distinguished Canadian geologist, whose researches led him to the conclusion that the radio-

Alongside, at right, is the Spanish American mine of Northspan Uranium. Below, on this page, Milliken Lake Uranium Mines Ltd.

active outcrops were, in fact, worthless, but that the geiger counters were recording radioactivity from a much greater depth and from disintegrated radium products on the surface. Oxidation of the pyritic outcrops, he believed, was leaching them of their uranium content at the surface.

After bringing the Algoma district to the attention of several leading mining companies without success, Joubin succeeded in interesting Joseph H. Hirshhorn, of Toronto and New York, a well-known and successful backer of mining ventures; on 12 May, 1952, the first 36 claims in the area were recorded on what is now the property of Pronto Uranium Mines.

Early in 1953 Joubin visited Britain, where he sought out geologists of wide experience in the South African fields, in order to learn as much as possible about the uranium-bearing Rand conglomerates, which he believed to be similar to the Algoma deposits. Diamond drilling was started on the claims on April 6, 1953, and samples from every drill hole revealed uranium ore. In July of the same year Hirshhorn formed a company to finance their exploration.

Joubin was convinced that the uranium he had located was no isolated occurrence but formed part of a vast formation snaking through the country north of Lake Huron in the form of a vast letter Z, a belief which was supported by a geological map of the district prepared by G. C. Collins of the Geological Survey of Canada in 1922. Joubin's theory was that the claims on which he had discovered uranium were on the south curve of the Z and that the northern curve would be found some 30 miles to the north in the vicinity of Quirke Lake.

Then began the now famous " back-door staking bee ", in which Hirshhorn and Joubin were joined by W. H. Bouck, president of a gold mining company, Preston East Dome Mines Ltd., which seized the opportunity to provide finance, staff and facilities on the scale required. Within four days of the receipt of the original drill results a staking crew of some eighty men was being flown to Algoma. To speed up the transfer of claims made against individual licences, lawyers were flown into the area to live with the prospecting teams.

Throughout the summer staking continued. Algom Quirke, situated at the extreme tip of the Z, and Algom Nordic in the mid-section were among the first and greatest prizes. The lovely Quirke Lake — cool, deep and surrounded by wooded hills — was found to have a valuable shore line and a bottom which was rich in uranium ore. One of the earliest properties to be staked was the Panel mine, situated on its rugged northern shore. Another notable find was Lake Nordic (now known as Lacnor), which was discovered about a rifle shot distant from Algom Nordic.

In six weeks the prospecting teams covered 90 miles of the Z-shaped strike, driving in their stakes wherever strong indications of radioactivity were registered by the geiger counters. On July 11, solicitors and engineers appeared at Mining Recorders' offices in various parts of Ontario. Between them they had more than 1,400 claims totalling 56,000 acres to record. The news sparked off the largest staking rush in Ontario's history — within a few weeks an additional 8,000 claims were staked and recorded by newcomers.

Other discoveries quickly followed. Across the lake from Panel were staked Can-Met and the Spanish American properties. On Lake Quirke, too, were found the Consolidated Denison properties, which were staked by a party under A. W. Stollery and proved to be the biggest single prize of all. By the end of 1953 H. S. Strouth and his associates had begun acquiring claims on the property that was to become Stanleigh Uranium. Between this property and the Lacnor claims was found the smaller but richer section now known as Milliken Lake mine. Finally, another company to enter the field was the Stancan Uranium Corporation which purchased a block of claims surrounding the 300-ft. rock on the shore of Lake Quirke. On this rock now perches the Stanrock, which towers over the lake like a lighthouse or fortress rather than a mine.

Almost before their claims had been recorded, Hirshhorn, Joubin and Bouck were tackling the formidable financial problems presented by the development of the potential producers which had been located on their vast holdings. In effect, the 1,400 claims were divided roughly into three parts—over 600 went to Algom, a company incorporated under the sponsorship of Preston East Dome to develop the huge deposits of Quirke Lake and Elliot-Nordic ; over 250 went to Pronto Uranium Mines ; the remainder were split among the many companies under Hirshhorn's financial sponsorship. Other holdings, not acquired by staking, were purchased outright, among them being those forming the present properties of Buckles, Lake Nordic and Pater Uranium (Rio Tinto enters the field). The amount of capital required for this gigantic project was beyond even Hirshhorn's resources, nor was financial support readily forthcoming at a time when there was still considerable scepticism as to uranium's commercial future. The problem was solved by the faith and vision of the British Mining Company. It was in May, 1956, that the Rio Tinto Co. Ltd., of London, identified itself with the development of Canada's uranium industry having previously by purchasing Hirshhorn's Algoma interests acquired a substantial interest in Algom Uranium Mines Ltd. Now, as the Rio Tinto Mining Co. of Canada Ltd., its merged character includes the Pronto Mine, the two Algom properties, the consolidated properties of Panel, Lacnor and Spanish American (with Buckles mine) as Northspan Uranium Mines Ltd.; and finally, since late in 1956, Milliken Lake mine. Hirshhorn is the chairman of the Rio Tinto Co. of Canada, in which he has retained a substantial shareholding.

The Producers

Today there are 12 mines in production in the Elliot Lake district. Pronto started production in October 1955, Algom's Nordic and Quirke mines in January 1957, Consolidated Denison in May 1957, Lacnor and Can-Met in November, 1957 ; Panel in March this year, Milliken Lake on April 28; Stanleigh and Stanrock in May. Spanish American, the final property to start production, shipped its first precipitates late in May, 1958. Twelfth on the list is Buckles Mine, which is in effect the No. 2 shaft of Spanish American. All twelve mines are now either in or verging on full-capacity output but Buckles will cease operations in the near future, its small orebody being virtually depleted.

Of the area's eleven huge mills, capable of handling a total of 35,000 tons of ore a day, seven belong to the Rio Tinto Mining Co. of Canada, built and brought into operation at an aggregate cost of nearly $200,000,000, the Rio Tinto properties have a combined daily production rate which now exceeds the scheduled total of more than 19,000 tons of ore a day. With total uranium oxide output from these properties running at an annual rate of about 7,500 s. tons, Rio Tinto will be responsible for about 60 per cent of the output of the Algoma Basin and about half the production scheduled for the whole of Canada. Its reserves are sufficient to maintain this scale of production into the 21st century.

The Group has been responsible for half the total investment in the entire uranium industry in Canada. Its subsidiary, Rio Tinto Management Services Ltd., is managing companies whose uranium contracts total more than $630,000,000. That held by Northspan Uranium Mines Ltd. for $275,000,000 is almost certainly the largest single contract of its kind in the world. Algom Uranium Mines Ltd. comes a close second with its contract of $206,910,000, while Milliken Lake Uranium Mines Ltd. and Pronto Uranium Mines Ltd. have contracts worth $94,525,000 and $55,000,000 substantially.

Nyasaland Iron Ore on Trial

A CONSIGNMENT of approximately 6,000 tons of Nyasaland iron ore has recently been dispatched to Germany. It is of high-grade quality and comes from Mindale Hill, about 15 miles from Blantyre, commercial capital of Nyasaland.

This shipload of ore — expected to be the forerunner of many others — is destined for steelworks in the Ruhr. It will be used directly in the manufacture of steel, instead of having to go through processing to pig-iron first, as most other iron ores do.

In the open hearth steel-making process, mother iron, steel scrap and various fluxes are heated and mixed together. Eventually the melt reaches a state of quiescence before the full clearing of the steel has been completed. In order to restore the tubulence, iron oxide is introduced. The oxygen in the ore combines with the carbon in the melt to form carbon dioxide. This brings the melt to the boil and completes the mixing of slag and molten metal to enable the impurities to be removed.

Iron ore for the process must be of exceptional purity containing a very high proportion of iron oxide. It must moreover, be very dense so that it will penetrate the slag layer and not merely float on top.

As far as can be judged before the actual processing takes place, the Mindale ore meets these requirements. The average iron content of this trial shipment is in excess of 67.7 per cent. This means it has an oxide content of about 98 per cent. The ore is very dense, weighing about 250 lb. to the cu. ft. It is almost free of impurities.

When mining began in March this year, some difficulty was experienced at first with the phosphorous content. The phosphorus occurred in the form of apatite, a calcium phosphate. Fortunately this took a visible crystal form which allowed sorting to be done by hand.

It has been found, however, that the visible phosphate decreases and almost disappears as the ore is taken from greater depths. At about 100 ft. from the surface the ore is practically pure.

The orebody itself forms a hill, rising some 300 ft. above the surrounding country. It consists of folded bands of ore in a pyroxene granulite countryrock matrix. The bands, of which about six are evident, average about 25 ft. in thickness.

In the immediate vicinity extensions of the orebody have been found which indicate that considerable reserves may be available. Other bodies with an iron content have been found which indicate the possibility of a mineralized belt, stretching about 100 miles across Nyasaland.

The First Shipment

In the production of the ore for the original shipment, mechanical equipment was necessary due to the very heavy nature of the ore. All countryrock and ore had to be drilled and blasted at a quarry face. Production consisted of removing the countryrock in one blast and subsequently removing the ore thus exposed to avoid contamination.

Both countryrock and ore were loaded by mechanical shovel to shuttle-dumpers which hauled the rock to waste dumps for road-making, and the ore to a crusher installation situated some distance away from the face. The ore was taken to Malimbe siding on the Salima-Blantyre railway line for railing to Beira.

It is expected that larger and heavier equipment will be employed for the removal of overburden to allow ore to be produced at the rate of about 500 tons a day.

Gravity Concentration of Small Quantities

THE micropanner, a small-scale version of the Haultain superpanner, is designed for the gravity concentration and separation of very small quantities of minerals or other materials. The apparatus has been described by L. D. Muller, mineralogist, Mineral Dressing Group, U.K. Atomic Energy Authority, in *Bulletin 623*, published by The Institution of Mining and Metallurgy. The illustration appearing herewith is reproduced from the same source.

Principles of Operation

The micropanner incorporates the same basic principles of operation as the superpanner, and although its construction differs, it possesses similar variables and controls. Due to its comparatively small size, suitable chosen heavy liquids (and liquids with densities less than unity) may be used on it in economic amounts so that materials having gravity differentials of less than 0.5 and ranging into very fine sizes, may often be successfully separated. As it is mainly intended for use with milligram quantities of fine materials, it is normally operated mounted on the stage of a stereoscopic binocular microscope to facilitiate control of the concentration or separation being attempted.

The micropanner consists essentially of a shallow rectangular V-section metal deck, covered with linoleum and carried on a reciprocating shaft which is supported in three bearings secured to a frame. This frame is hinged to a base plate and has a pair of cams which enables the slope of the frame, and thus of the deck, to be varied.

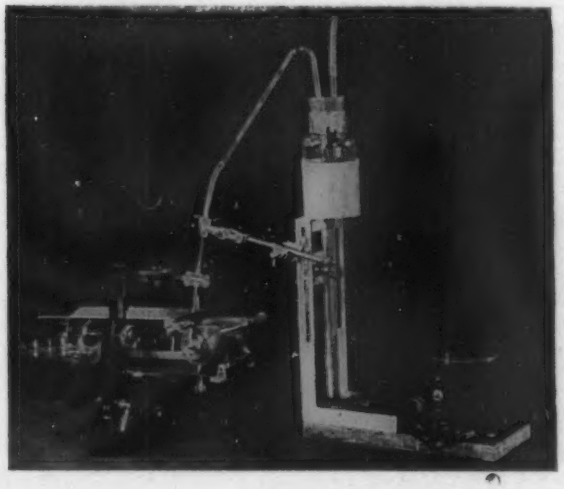
The reciprocating shaft is actuated by an 18-tooth ratchet wheel driven, through a pair of gears, by a fractional h.p. electric motor. The shaft is spring-loaded and also carries a threaded stop-nut and lock-nut which enables the amplitude of the shaft movement to be varied from zero to 3/32 in., the maximum depth of the ratchet wheel teeth. The second milled nut on the shaft allows the compression on the return spring to be varied. A rocking motion, tranverse to the action of the shaft, is applied to the deck through a linkage mechanism and an adjustable eccentric mounted on the ratchet wheel spindle.

The following variables can be imposed on the micropanner deck; length of stroke, by adjustment of the stop-nut and thus the degree of engagement of the shaft with the ratchet wheel teeth; frequency of stroke, by variation of the motor speed; rate of return and force of impact, by alteration of the return spring compression; amplitude of transverse motion, by adjustment of the eccentric; speed of transverse motion, by variation of the motor speed; longitudinal slope, by rotation of the frame cams; amount of wash liquid, and depth of pool on weired deck, by height adjustment of the glass capillary tube.

Heavy liquids may also be used in difficult cases to increase the probability of separation. A gravity differential of 0.5, as between a given pair of minerals, is often accepted as the lower limit for satisfactory separation in water but, by increasing the density of the operating liquid, the Taggart "concentration criterion" existing for such a pair of minerals may, at times, be increased sufficiently above the stipulated lower limit of 1.25 to enable a separation to be achieved which may otherwise be impossible using water. Similarly, liquids with densities less than unity may be used with advantage with very fine materials, as the apparent densities of the particles are increased and they thus tend to settle more readily into contact with the deck.

As the micropanner is virtually a small-scale version of the Haultain superpanner, the method of operation is very similar to that used on the superpanner though it may be stressed that, as with the superpanner, successful operation is a matter of experience. With either deck, the normal speed of operation is in the range of 350 to 550 strokes per min.—considerably higher than that used with the superpanner—while for most separations the water flow rate is in terms of drops per min. rather than as a continuous flow. Present experience has shown that an operating liquid of sp. gr. 1.6 to 1.8 has proved satisfactory in separating minerals with differentials of the order of 0.5 and with sp. gr. in the range 2.7 to 5.3.

The micropanner and ancillary equipment ready for use



Applications of the Micropanner

Some applications of the micropanner and its flexibility in dealing with a variety of problems of separation and concentration are reviewed. First, a simple type of separation using the weired deck and water. Four g. of a synthetic mixture of quartz, pyrite (5 per cent) and galena (3 per cent) in the size range 72 to 150 mesh Tyler have been used to give a clean galena tip followed by pyrite and a clean quartz tailing. Second, the monazite concentrate was recovered from a $-360 +100$ mesh sinks fraction of a heavy liquid separation. The weired deck and water were used and concentration was obtained in 10 minutes.

In the third instance described, a -325 mesh zircon tip was derived from a 56-mg. -42 mesh fraction of a Glen Urquhart gneiss. The fraction, initially obtained as a superpanner concentrate, contained a little coarse to fine kyanite, coarse to fine rutile and fine zircon. A line-covered open-ended deck and water were used to obtain a zircon tip which was developed in rather less than five minutes. As a final instance, the secondary uranium tip was concentrated from a small quantity of a -100 mesh $+43\ \mu$ feed comprising essentially a brown mica and iron-stained silicates (sp. gr. 2.7). The feed was a low-grade concentrate representing the best separation that could be obtained using the Haultain superpanner. Further upgrading on the micropanner was not possible using water, but was achieved using a heavy liquid (bromoform/benzine of density 1.8) and the aluminium deck. About 10 ml. of the heavy liquid was required.

Liberia's Diamond Laws

IN 1957, exports of diamonds from Liberia reportedly totalled 799,987 cts., valued at U.S.$1,538,058. Of this total, 19,542 cts., valued at U.S.$193,096, was gems and 780,445 cts., valued at U.S.$1,344,962 included bort, sand, and industrials, according to the Bureau of Natural Resources and Surveys in Liberia.

Many of the diamonds exported from Liberia were chiefly from Sierra Leone and French Guinea. The quantity of diamonds exported probably is greater than the official figures given because of the smuggling traffic. The 1957 value of exports reflects the official Liberian assessments, which are claimed to be one-fourth of the estimated world-market value. Assessments actually may be as low as 10 to 15 per cent of market value.

Early in 1957, as a result of publicity given to diamond discoveries in 1956, workers from other industries in Liberia moved to the diamond mining region of the Lofa River in Western Liberia. The diamond rush emphasized the need for defining the official policy of the Liberian Government for exploiting its diamond resources, and on April 15, 1957, the government issued a temporary order suspending diamond mining operations for an indefinite period.

A commission was created by President W. V. S. Tubman to investigate the situation existing in the diamond area and to suspend all prospecting and mining operations in the areas of Yangayah, Gondorja, Weasvah, Tapoima, and Bopolu until the government formulated a policy on the mining and purchasing of diamonds.

Association of Miners

Another development as a result of the diamond episode was the forming of the Liberian Association of Miners on June 1, 1957. On June 10 the organization presented a petition to President Tubman requesting the reopening of the diamond mining area and the registration of miners, prospectors, and labourers with the Bureau of Mines and Geology. The president indicated that government policy was being formulated at that time. On April 4, 1958, it was reported that the Association had adopted the name of Liberian Diamond Miners' Union. The objectives of the union reportedly are to maintain the stability of the Liberian economy in the diamond and gold mining fields and to aid members who require financial assistance.

According to reports during August, 1957, President Tubman established a committee of six government officials and three members of the Diamond Association to formulate rules and regulations to govern the mining of diamonds in Liberia, while in January, 1958, he established a three-man commission to probe into violations of the special Executive Order of October 16, 1957, prohibiting diamond mining in the restricted Bopolu area.

On March 14, 1958, the Legislature of Liberia enacted the long-awaited diamond statute. On July 15, 1958, by order of the president, the Liberian diamond fields were reopened to prospecting and mining. One of the two executive orders issued on the reopening of the mines outlines 10 provisions of the law concerning the size of mining claims, the repossession of mining claims that had been suspended, and the reservation of the Lofa River from exploitation by any ordinary licensee. The other executive order amends the new diamond law pending action by the next session of the Legislature.

Legal Revisions

The specific changes are as follows: Where the law had provided for the deportation of any foreigner found engaged directly or indirectly in the diamond industry, except upon concession, the executive order permits foreigners to purchase, sell, and export diamonds "where 50 per cent ownership is in Liberian hands". Where the law had established fees for prospecting licences at $100 and for mining licences at $500, the order reduces these fees to $50 and $300, respectively, and adds a $500 fee for brokers' licences and a $1,000 fee for purchase and export licences.

New Explosive at Nchanga

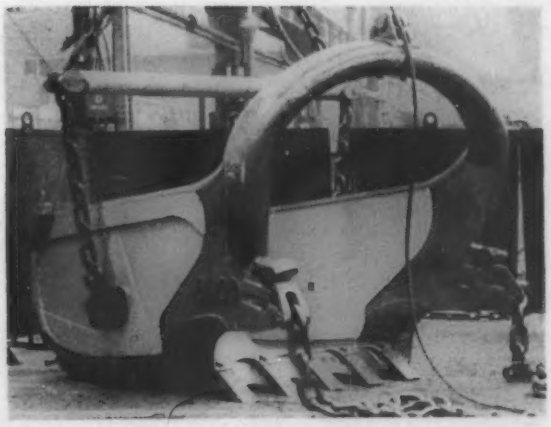
A NEW explosive has just been used successfully at the Nchanga Open Pit, Northern Rhodesia. The new explosive was made by African Explosives and Chemical Industries, and this is the first occasion upon which it has been used anywhere in Africa. The exact formula is well-known in the United States, but has never been made known in South Africa. It is known, however, that the explosive consists mainly of ammonium nitrate and fuel oil.

The advantages of ammonium nitrate are that it reduces fly-dirt and that it does not become live until mixed before charging. In the Nchanga Open Pit tests, 560 lb. of the explosive were used to blast 2,400 tons of rock. Breakage was 300 tons per hole.

Bucyrus Erie 150-B excavator in Nchanga open pit

Machinery and Equipment

The Public Works and Municipal Services Congress and Exhibition



The Public Works and Municipal Services Congress and Exhibition, to be held at Olympia from November 10 to November 15, is attracting many manufacturers of equipment intended primarily for duties in earthmoving applications. Nevertheless, these machines have wide and varied uses in the opencast mining and quarrying industries, as well as in mine surface yard operations such as stockpiling, stacking, clearance and the like. For this reason the "Public Works" is featured in this and the subsequent issue of *The Mining Journal*.

The VT4 portable compressor will be the centrepiece of the equipment displayed by *Atlas Copco (Great Britain) Ltd.* Additionally, Atlas Copco are introducing to the British market four other machines, including the Vertical Air Leg, the Tiger rock drill, and the T2G loader/dumper. The Twin-air Portable Rotary Screw Compressor, shown to the Technical Press this week, is also to be exhibited. Other varied equipments will also be shown.

The VT4 is claimed as the only portable compressor available at present guaranteeing a free air delivery of 140 c.f.m. from a Ford 4-cylinder industrial diesel engine operating at the moderate speed of 1,400 r.p.m.

The Vertical Air Leg, type BMP 31, fills the gap existing in bench drilling equipment between hand held machines and wagon drills. The rock drill is raised and lowered by compressed air, facilitating thereby drill steel changes and minimizing operator fatigue. Drill steel changes can be achieved in about 30 secs., while the time taken for pulling out, moving and fitting the equipment in a new anchor bolt hole is only about 2 min.

The Tiger rock drill weighs 60 lb. and is designed for high speed drifting and stoping operations. Mounted on the BMT 50 retractable leg, all operating controls are on the back head of the drill, enabling the driller to operate the machine with one hand.

The T2G combined loader and dumper powered by compressed air consists essentially of an overthrowing type of shovel loader mounted on a rubber tyred dump wagon. The T2G has a 3½ cu. ft. bucket operated by a vane-type motor.

Above is shown the Esco triple tapered dragline bucket. Below, at left, is the Tiger rock drill and, at right, the Euclid TS-24 twin-powered scraper

Hadfields Ltd. will be exhibiting at the Public Works and Municipal Services Exhibition for the first time. Amongst the several major exhibits, focus is on the 6 cu. yd. Esco Triple-Tapered Dragline Bucket. Special features of this machine include triple-tapered design for faster filling, cleaner dumping and longer bucket life.

Other exhibits will be the Esco medium-duty dragline bucket, of ¼ cu. yd. capacity, the Esco dozer rooter, model 35, to fit any make or model of straight or angle dozer with blade heights from 31 in. to 50 in., a 24 in. by 12 in. roller-bearing jaw crusher, and other equipments.

Blackwood Hodge will display the Euclid TS-24 Twin-Powered Scraper and the Euclid C-6 Crawler tractor. The TS-24 has a payload of 80,000 lb. and a gross weight of 156,100 lb. The complete overall length of the unit is 45 ft. 7 in. and its width 11 ft. 7½ in. Width of cut is 10 ft. 3½ in., maximum depth of cut 1 ft. 1½ in., and maximum depth of spread 2 ft.

The C-6 Crawler has 218 h.p. delivered to the power train through a torque converter and semi-automatic transmission. The C-6 is 178 in. long, 100 in. wide, and has a drawbar height above ground of 21¼ in. A total of 115¼ in. of tracks are on the ground.

The Spearhead Drill Stem Adaptor Bit, to be shown by *Rip Bits Ltd.*, is stated to be new to the United Kingdom. In preparation for the Spearhead, some 3 in. is cut from the end of a worn or broken tungsten carbide-tipped drill steel, an 8 deg. inclusive taper is machined or ground on the rod end and the tip faced to a dia. of 0.8 in. Subsequently the Spearhead adaptor bit can be attached.

The manufacturers claim that the Spearhead drills approximately two-thirds of the life of a new tungsten carbide-tipped drill stem, and that its use is cheaper than the practice of re-tipping stems. The single chisel design enables the bit to be ground without removing it from the rod.

The main exhibit of *Caterpillar Tractor Co. Ltd.*, will be the Caterpillar D8 crawler tractor, equipped with a No. 8S bulldozer and hydraulic cable control, and Hyster D8D towing winch. The tractor has a 225 h.p. turbocharged six-cylinder diesel engine and the machine,

The Vickers Vigor tractor

weighing 46,734 lb., has a ground clearance of 19¾ in. There are six forward and six reverse speeds.

Also exhibited will be the Caterpillar D7 crawler tractor, the Caterpillar DW21 tractor and No. 470 scraper, and the hydraulically-controlled No. 8A ripper. A DW21 and PR21 rear dump wagon will also be on view.

The Consolidated Pneumatic Tool Co. Ltd., will be exhibiting a full selection from their range of pneumatic tools, including rotary compressors, drills, breakers, clay spades, back fillers, vibrators, picks and pumps. Of particular interest is the example of the Class F.E. range of balanced opposed compressors which has been recently introduced and is shown at the exhibition for the first time. Other new items include the new C.P. 503 Tornado drill, a new fast tunnel drill in the 50 lb. weight class and two new versions of the triple tampers; the new models 387 and 487 being the result of a complete re-design which gives greater compaction and handling qualities.

The company's range of oil-flooded rotary power vane compressors will be represented at this exhibition by two units, namely a 365-RO-2 fitted with a Rolls-Royce engine and a 120-RO-2 model fitted with a Ford engine.

This year marks the first appearance of the *Cummins Engine Company Ltd.*, at the Public Works Exhibition. Four engines will be displayed, namely the HU-6-P, a 6-cylinder naturally aspirated diesel engine having a bore and stroke of 4¼ in. x 6in. and a total displacement of 672 cu. in., the NHRS-6-IP, a 6-cylinder naturally aspirated diesel engine having a bore and stroke of 5½ in. x 6 in. and a total displacement of 743 cu. in., and the NRTO-6-BI, a 6-cylinder turbocharged diesel engine having a bore and stroke of 5½ in. x 6 in. and a total displacement of 743 cu. in.

The fourth engine to be displayed on the stand has been sectioned; the cut-away portion revealing the basic design and construction of Cummins diesel engines. The Cummins PT fuel system is demonstrated by cut-away components.

On a combined stand area of nearly 5,000 sq. ft., *Jack Olding and Co. Ltd.*, in association with *Barber-Greene Olding* will be showing a range of machines used in various stages of road construction.

Manufactured by Vickers-Armstrongs (Tractors) Ltd., powered by a Rolls-Royce supercharge 6-cylinder diesel delivering 190 flywheel h.p. at governed speed of 1,800 r.p.m., the Vickers Vigor tractor is available with direct drive or torque converter transmission. With direct drive the maximum drawbar h.p. is 150; six forward and three reverse gears give operating speeds up to 9.73 m.p.h. The torque converter model has three forward gears giving operating speeds up to 8.8 m.p.h., and a maximum calculated drawbar pull of 38,000 lb. at 0.75 m.p.h.; a single reverse gear gives a speed of 0-5.15 m.p.h. The Vickers Vikon tractor is the latest tractor produced by Vickers-Armstrongs (Tractors) Ltd. In design and construction it closely resembles the larger Vickers Vigor. It is powered by a Rolls-Royce supercharged 4-cylinder diesel delivering 143 belt h.p. Drawbar h.p. 116. Five forward and four reverse gears, give operating speeds up to 8.85 m.p.h. at engine governed speed of 1,800 r.p.m.

Other equipments displayed will include mixing plant, the Wakefield 603 motor grader and the British-built Hendrix 7 cu. yd. HS dragline bucket.

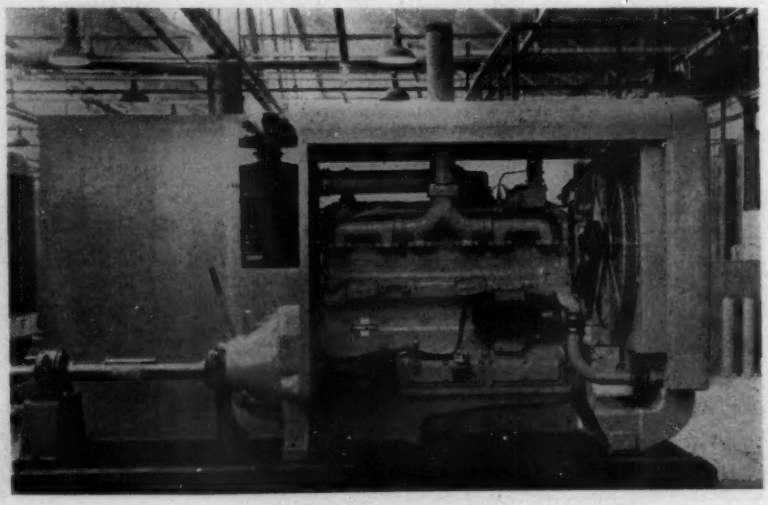
Production of this 7 cu. yd., dragline bucket has recently commenced at Jack Olding's Hatfield Works, to meet the demand created largely by the increased number of Lima 2,400 excavators now working in Great Britain. The majority of these excavators are equipped with the American-built bucket. The British counterpart is built to the same design and specification. British-built buckets have been working for some months and have been shown to give an equally satisfactory performance.

Ransomes and Rapier Ltd., will show the Rapier 3½ cu. yd. high discharge truck mixer, to be exhibited mounted on a lorry chassis, the Rapier 3½ cu. yd. horizontal drum mixer, with a capacity of 5 cu. yd. when handling an unmixed batch of 4½ cu. yd. of pre-mixed concrete when used as an agitator, and the Rapier 3 cu. yd. tilting agitator for pre-mixed concrete.

Also on exhibition will be examples from the company's range of self-priming pumps with capacities from 4,000 to 80,000 gals. per hour. All the pumps have fully automatic self-priming action which gives quicker prime and a larger air capacity than comparative units.

Motor Rail Ltd., will be introducing a new dumper at the Exhibition. Designated the MR-4 this is a reversible steering dumper with a working capacity of 4 cu. yds. It employs a Dorman 2LB engine. Another exhibit will be a newly-designed 30 h.p. Simplex Diesel Locomotive which also employs the Dorman 2LB engine, and is the most compact vehicle that has yet been built by the company.

The Cummins HU-6 diesel engine



MINING MISCELLANY

Representatives of the technical press attended a preview of new equipment manufactured by Atlas Copco on Tuesday of this week. The display was held at Hemel Hempstead, the site of the new Atlas Copco (Great Britain) Ltd. factory in this country. It is hoped that the factory will become operative by midsummer next year. The Wembley plant will be closed. The equipments shown were the Atlas Copco twin-air portable rotary screw compressor, the bencher, the Tiger rock drill, the T2G combined loader and dumper, the VT4 portable compressor, and the E20 paving breaker. All these equipments are to be displayed at the Public Works and Municipal Services Congress and Exhibition at Olympia next week, and certain of them are described on the pages which relate to the Exhibition elsewhere in this issue.

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In an experiment to rejuvenate some below standard soils in the northern province of Nyasaland, Nyasaland's own resources of raw calcium phosphate are being used. The Department of Agriculture is trying out several hundred pounds of phosphate given it by the Anglo American Corporation subsidiary which has mineral concessions for the apatite deposit at Tundulu Hill.

★

One of the earliest windups of shipping in history is planned by the major operators of the Great Lakes iron ore fleets in the U.S. For most of the boats this will also be one of the shortest navigation seasons on record. The majority of the boats did not get out until mid-May, with some moving out as late as early June. With only 170 of a total fleet of 250 boats operating, the length of the shipping season, and expected ore tonnages, 1958 will be the slowest period in 20 years. It is estimated that 52,000,000 tons will be moved down the Lakes compared with 84,000,000 tons last year. This would be a drop of nearly 40 per cent. The slow pace of ore movement this year was dictated by record high stockpiles of ore at steel mill blast furnaces and vessel unloading docks in the U.S., at the beginning of the Lakes shipping season.

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The first two of a series of classes for prospectors, held by the Ontario Department of Mines, will take place this winter at Ansonville and Hearst, Ontario, Canada. The classes, which were inaugurated in 1894, have become a traditional annual service of the Department, and each year they are held in about twelve centres throughout the province.

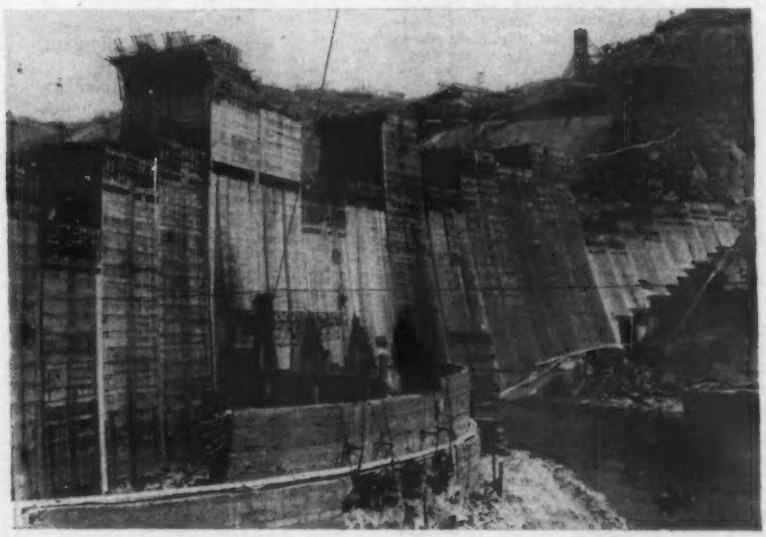
★

In Czechoslovakia, a new brown coal mine is being established in the Prievidza region of central Slovakia, where rich deposits have been found. The prospects for exploitation are stated to be for a period of 70 to 75 years. Output will rise to 7,200,000 tons a year by 1967. Meanwhile, a tunnelling record is claimed on behalf of a team of 28 men at the ore mines at Pribram, Bohemia. Surpassing their own previous "world's best", they have driven 596.5 metres of gallery in a month.

★

Sheepbridge Equipment Ltd., one of the Sheepbridge Engineering Group, Chesterfield, Derbyshire, have just finished building this complete headgear for the Silverhill Colliery at Teversal, Nottinghamshire, in the No. 4 Area of the East Midlands Division of the National Coal Board; 70 ft. in height, the headgear is fitted with the Sheepbridge overwind safety-catch gear which has an automatic lubricating system

The main wall of the Kariba Dam on the Zambesi River in Rhodesia. This recent photograph shows the present position of work. When completed the dam will be a concrete arch with a maximum height of 420 ft. a crest length of 1,900 ft. and will be wide enough to take a 40-ft. roadway



The Malayan Mining Co. and Kepong Mines Ltd. are examining prospects for the development of more iron ore deposits in the Federation of Malaya, according to Mr. Tsang Tak Chuen. Mr. Tsang is the senior partner in the Malayan Mining Co. and chairman and managing director of Kepong Mines Ltd. He considers that his companies can reasonably expect to find a considerable amount of undeveloped iron ore deposits in the Federation. Malayan Mining has operated iron ore mines in Tambun, near Ipoh, since 1955, while Kepong Mines opened their mines in Kampong Bukit Kepong, Johore, early this year. The present capacity of the two mines is in excess of 500,000 tons of iron ore a year. Mr. Tsang states that he is hopeful that Japan would continue to buy iron ore from Malaya in large quantities. In January-July this year, Japan took from Malaya 1,214,853 tons of iron ore, worth $M29,000,000.

★

The National Coal Board scholarships in mining engineering and allied subjects have been awarded this year to 23 young men in the mining industry and 51 outside it. The scholarships cover the whole cost of education and carry a maintenance allowance which may amount to £355 a year, irrespective of family income. About 100 scholarships are offered each year.

★

Bulgaria's Five-Year Plan for the period 1958-62 foresees an increase in

output of lead to 33,000 tonnes, and in that of zinc to 44,000 tons by 1962. The overall production increase scheduled for industry is 60 per cent, that for capital goods 77 per cent, and that for consumer goods 50 per cent.

★

The Joy Manufacturing Co. (Peru) S.A., an affiliate of Joy Manufacturing Co. Inc., of Pittsburgh, Pennsylvania, U.S., manufacturers of underground mining equipment, inaugurated their new plant and sales office at Km. 5½ of the Central Highway, near Lima, Peru, recently. The factory, which cost Soles 2,000,000 and covers an area of 5,000 sq. metres, is equipped with machine tools imported from the U.K. It will overhaul, repair, and manufacture some spare parts for all types of mining equipment.

★

Statistics compiled up to the end of June estimate China's iron ore reserves as 100,000,000,000 tons, coal 1,500,000,000,000 tons, and phosphorus 30,000,000,000 tons.

PERSONAL

Sir Douglas Waring has been appointed a director of Ampat Tin Dredging.

★

Mr. J. B. Leworthy and Lieut. Comdr. Jonathan Leigh have been appointed directors of Mawchi Mines.

★

Mr. L. Marsh, M.B.E., has been appointed staff director of the North Eastern Division of the National Coal Board, in succession to Mr. R. G. C. Cowe, who was appointed deputy secretary at National headquarters.

★

The chairman of Mawchi Mines, Lieut. General Sir Ernest Wood, and Mr. J. B. Leworthy, a director, are leaving for Burma on Monday. During their stay they will visit the mine and hold discussions with the government on the company's future operations. The visit will last approximately one month.

★

Mr. G. K. Allen, B.M.E., M.I.M.M., has been appointed to the board of Mining Services (P.E.) Ltd., a member of P.E. Management Group Ltd.

★

Mr. G. C. Pearce has relinquished his executive duties in Consolidated Tin Smelters Ltd., and has retired from the boards of directors of that company and its subsidiaries, Williams, Harvey & Co. Ltd., Eastern Smelting Co. Ltd., Sydney Smelting Co. Pty. Ltd., and Geo. L. Scott & Co. Ltd.

★

Mr. S. M. Robertson has been appointed assistant managing director of Consolidated Tin Smelters Ltd., and a director of its subsidiary company, Williams, Harvey and Co. Ltd.

★

Mr. W. H. Monier-Williams has been appointed a director of Eastern Smelting Co. Ltd., a subsidiary company of Consolidated Tin Smelters Ltd.

★

Sir Digby Vere Burnett, a prominent mining engineer in South Africa and later in Rhodesia, has died at the age of 83. He went to South Africa in 1892, and worked in the Johannesburg area. In 1906 he went to the west coast as manager of mines, associated with the Edmund Davis Group. From 1920 to 1950 he was general manager of the London and Rhodesian Mining and Land Co., and for the last 16 years of that period was also resident director of that company.

★

Mr. W. E. Aitken has been appointed a director and the secretary of the Siberian Syndicate and Palmarejo and Mexican Gold Fields.

★

Mr. P. W. Litchfield, has been appointed honorary chairman of the board of the World-Wide Goodyear organization, in Akron, U.S.A. Mr. E. J. Thomas becomes chairman of the board of directors and continues as chief executive officer of the company. Mr. Russell DeYoung has been elected president of the company. Mr. P. E. H. Leroy continues as the company's chief financial officer and becomes vice-chairman.

★

Mr. G. E. Savory, sales director, and Mr. D. H. Marlow, export sales manager, Ruston-Bucyrus Ltd., Excavator Works, Lincoln, left recently on a visit to the United States, New Zealand, Australia, and Singapore, returning at the end of November.

★

Mr. F. J. Havenith has joined the board of Kent-Continental S.A., the Belgian subsidiary of George Kent Ltd., as local resident director.

★

Mr. H. P. Lord, A.F.C., B.Sc., General Sales Manager, has been appointed to the board of Sigmund Pumps Ltd.

★

Mr. G. Almrott has been appointed to the board of directors of the British company, Caterpillar Tractor Co. Ltd.

★

Mr. N. McCann, Mr. R. G. J. Nisbet, Mr. J. A. Jackson, and Mr. W. N. Scottorn, have been appointed to the board of Wolf Electric Tools Ltd.

COMPANY EVENTS

The French non-ferrous mining concern, Penarroya, is to merge with the French mining organization, Compagnie Minière du M'Zaita, which owns copper mines in Chile. The merger will be achieved by offering shareholders of M'Zaita—in which Penarroya, together with the bank of MM. Worms et Compagnie, is a major shareholder—one new Penarroya share in exchange for two of M'Zaita's. An official of Penarroya said the new set-up would facilitate the financing of expansion plans for the Chilean mines, and would help Penarroya consolidate its position in the field of copper mining, in addition to its activities in lead and zinc.

★

The activities of the Tudor Accumulator Co. Ltd. are to be completely merged with those of the D.P. Battery Co. Ltd., Derbyshire, who will produce and market the range of Kathanode and Tudor lead-acid batteries previously supplied by the separate companies.

★

As from December 1, 1958, the new headquarters of the City and Guilds of London Institute, will be at 76 Portland Place, London, W.1. The new telephone number is Langham 3050, and the telegraphic address, Civic, Wesdo, London. The Institute will be closed from December 1, to December 31, except for the receipt of letters.

★

Derby Cables Ltd., member firm of the Crompton Parkinson Group, and prominent cable manufacturers for over 29 years, have recently brought into production a new cable shop, which is producing Theroplastic Cables of many types.

★

The Solartron Electronic Group, Ltd., Thames Ditton, Surrey, have concluded selling and manufacturing licensing agreements for the "Kintel" range of electronic products of the Cohu Electronics, Inc., of San Diego, California, U.S.A., which covers the whole world, with the exception of Sweden, and North and South America.

EXHIBITIONS AND CONFERENCES

The Cadman Memorial Lecture takes place at the Royal Society of Arts, London, on November 19. The lecture is entitled "Improving the Efficiency of the Mining Industry" and will be given by Mr. H. A. Longden, B.Sc., A.M.I.C.E., F.G.S., Director-General of Production, National Coal Board, and president, Institution of Mining Engineers. Applications for tickets should be addressed to the secretary of the Society.

★

The inaugural lecture of Mr. F. D. Richardson, D.Sc., Ph.D., M.I.M.M., F.I.M., as Professor of Extraction Metallurgy of the Imperial College of Science and Technology, is now available in report form. The report is entitled *The Changing World of the Extraction Metallurgist.*

CONTRACTS AND TENDERS

Korea

Tin, ingot, grade A, 66,000 lb. Zinc, slab, grade 5 or higher, 11,000 lb. Procurement Authorization No. 89-99-L1-8223 (Invitation No. 284-M-5). Issuing Authority and address to which bids should be sent, Office of Supply, Government of the Republic of Korea, Seoul, Korea. Closing date, November 27, 1958. Ref. E.S.B. 26767/58/I.C.A. Telephone inquiries to Chancery 4411, extension 354.

GRADUATE WITH MINING DEGREE

from a recognized school of mines or university and with not more than one year's subsequent experience required by

large copper mine in Northern Rhodesia

Successful applicant will initially undergo course covering practical and technical training with view to an official position.

Starting salary upwards of £1,000 p.a. depending on experience plus variable bonus, at present 17% of basic salary and cost of living allowance currently £70 p.a. There are also pension, life assurance and generous medical schemes.

Free outward passage. Leave at 41 days p.a. may be accumulated up to 123 days. Married accommodation available after three to five months.

Send particulars, age, qualifications and experience to:

Appointments Officer R.4/M.J., Mine Employment Department, Selection Trust Building, Mason's Avenue, London, E.C.2

Metals and Minerals

Wolfram on the Way up Again

Wolfram pre-shipment prices continue to move upward on the London market. Dealers now report that further business suggests a range of from 75s. to 80s. per l.ton unit c.i.f. Europe compared with 72s. to 77s. previously and with 60s. to 65s. a month ago. Business is understood to have matured within and at the top end of the range. Some of it is believed to be on account of smelters covering their sales of ferro-tungsten to the steel industry. Moreover, available unsold stocks of ore in Europe are said to have been reduced.

In New York foreign tungsten ore is currently quoted at $8.25-$8.50 per s.ton unit c.i.f. U.S. ports, as compared with $7.50-$8.00 a fortnight ago.

The most hopeful factor in the tungsten outlook is, of course, the expansion of steel production in the U.S. Last month output rose above 2,000,000 tons in a week for the first time this year. In the week ended Saturday, October 25, it reached 75.1 per cent of rated capacity and totalled 2,026,000 tons, being the highest amount since 2,041,000 tons were produced in the week starting October 28 last year.

This strong recovery took place without the expected heavy orders from motor-car manufacturers, which have been delayed by labour troubles and should soon be coming forward. Fourth quarter operations are forecast at appreciably above three-quarters of capacity despite the inevitable decline as the Christmas holidays approach.

In the U.K. prospects for steel producers have been improved by the easing of the credit and H.P. restrictions and by the increased sum which is to be made available by the government for investment in the public sector.

Since the steel industry uses over 90 per cent of the world supply of tungsten metal, its revival must lead to a corresponding improvement in the consumption for wolfram and scheelite, which is likely to be accentuated by the growing outlet for tungsten in the field of high temperature alloys.

Mr. F. Gates, chairman of Beralt Tin and Wolfram, in his address at the annual meeting (p. 515), reminded shareholders that volatility of the wolfram market could be just as marked when prices began to rise as when they were falling. He recalled that the average price realized over the previous five years for the company's wolfram concentrates was about 330s. per unit. At the time of the meeting the price stood at about 70s. per unit. With a concentrate containing 75 units of WO_3 per ton, which is the company's normal grade, this price difference represents a fall in sales value of nearly £1,000 per ton and a fall in net yield at the mine, after deducting export tax, of about £720 per ton.

Thanks to the consistency of mineralization in its main mine and the steps that have been taken over the past years to introduce new cost-saving equipment, Beralt Tin and Wolfram can operate successfully at much lower prices than most of its competitors. Even so, it could scarcely produce wolfram profitably at the price of under 65s. per unit to which the market recently fell—a price which was probably the lowest in terms of real values since the company was incorporated in 1927.

Many producers throughout the world have been obliged to suspend or curtail operations because of the uneconomic prices prevailing over such a long period. Having regard to the inevitable time-lag, once a mine has closed down, before production can be resumed, the possibility that the revival of the steel industry might result in a temporary shortage of tungsten can by no means be excluded.

HIGHER MOLYBDENUM PRICES

Climax Molybdenum Co., a division of American Metal Climax Inc., has announced increases of about 5 per cent in its prices for most molybdenum products, effective November 1. Typical prices per lb. of contained molybdenum, according to the new schedule, are: molybdenite concentrate $1.25, canned molybdic oxide $1.47, and ferro-molybdenum $1.76.

Last month American Metal Climax reopened its mine and mill after an 84-day shutdown caused by a strike of 1,100 workers. The Climax Molybdenum Division produces over half the U.S. supply of molybdenum. In the circumstances the rise in prices comes as no surprise, particularly in view of the more encouraging outlook for molybdenum.

U.S. TITANIUM PRICE CUTS

Mallory-Sharon Metals Corporation has made substantial price reductions on its titanium sponge, billets and bar products, following similar cuts made recently in the U.S. industry. The price of titanium sponge, in quantities over 500 lb., to a maximum of 100 Brinell hardness, has been cut to $1.62 a lb., down about 15 per cent from the former price. The basic price of titanium billet stock has been lowered from $4.10 a lb. to $3.80 and bar prices from $5.25 to $5.10. These reductions should be of material assistance to producers in their efforts to develop new outlets for titanium.

S.A. URANIUM FOR JAPAN

Under a contract signed recently in Pretoria, South Africa is to sell uranium oxide in concentrated form to the Atomic Fuel Corporation of Japan. Negotiations took place between the Transvalia Import and Export Co. of Pretoria and the Mitsubishi Sheji Kaisha Co. of Tokyo on behalf of the two companies. The

LONDON METAL AND ORE PRICES, NOV. 6, 1958

METAL PRICES

Aluminium, 99.5%, £180 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Crude (70%) £190 per ton
Ore (60%) bases 19s. 6d./20s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 9s. 6d. lb.
Cerium (99%) net, £16 0s. lb. delivered U.K.
Chromium, Cr. 99%, 6s. 11d. lb.
Cobalt, 16s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 5d. per gram.
Gold, 250s. 1½d.
Iridium, £20/£22 oz. nom.
Lanthanum (98/99%) 15s. per gram.
Manganese Metal (96% - 98%) £290
Magnesium, 2s. 5½d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £17/£18 oz. nom.
Osmiridium, nom.
Palladium, £5/£5 15s.
Platinum U.K. and Empire Refined £21 5s. oz.
Imported £18 15s./£19 15s.
Quicksilver, £78 0s. ex-warehouse
Rhodium, £40/42 oz.
Ruthenium, £14/£16 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 77½d. f. oz. spot and 77½d. f'd.
Tellurium, 15s./16s. lb.

ORES AND OXIDES

Bismuth		65% 8s. 6d. lb. c.i.f. 18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—		
Rhodesian Metallurgical (semifriable) 48%	(Ratio 3:1)	£15 15s. 0d. per ton c.i.f.
" Hard Lumpy 45%	(Ratio 3:1)	£15 10s. 0d. per ton c.i.f.
" Refractory 40%		£11 0s. 0d. per ton c.i.f.
" Smalls 44%	(Ratio 3:1)	£14 0s. 0d. per ton cli.f.
Baluchistan 48%	(Ratio 3:1)	£11 15s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade		nom.
Fluorspar—		
Acid Grade, Flotated Material		£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)		156s. 0d. ex works
Lithium Ore—		
Petalite min. 3½% Li_2O		40s. 0d./45s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O		40s. 0d./45s. 0d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O		£25 0s. per ton f.o.b. Beira
Magnesite, ground calcined		£28 0s./£30 0s. d/d
Magnesite Raw (ground)		£21 0s./£23 0s. d/d
Manganese Ore Indian—		
Europe (46% - 48%) basis 55s. 0d. freight		83d./85d. per unit c.i.f. nom.
Manganese Ore (43% - 45%)		70d./75d. per unit c.i.f. nom.
Manganese Ore (38% - 40%)		50d./54d. per unit c.i.f. nom.
Molybdenite (85%) basis		8s. 5d. per lb. (f.o.b.)
Titanium Ore—		
Rutile 95/97% TiO_2 (prompt delivery)		£35/£36 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO_2		£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)		76s. 0d./81s. 0d. per unit c.i.f.
Vanadium—		
Fused oxide 95% V_2O_5		8s./8s. 11d. per lb. V_2O_5 c.i.f.
Zircon Sand (Australian) (65 - 66% ZrO_2)		£14 0s. per ton c.i.f.

shipment will be dispatched before the end of the year and will be used for experiments in three atomic reactors already erected in Tokyo. It is hoped that the sale of uranium oxide will be increased to several hundred tons a year.

ITALIAN QUICKSILVER CRISIS

The Italian quicksilver industry is passing through a serious crisis, according to the General Confederation of Italian Industry. The Confederation asserts that current trade union agitation in the mines is probably aimed at total nationalization of the industry. Trade unions, on the other hand, claim that sit-down strikes at certain mines in the Monte Amiata region result from a breakdown in conciliation talks on wages.

The Confederation, in its announcement, said that the wage policies of the mines concerned, owned by Societa Siele and Societa Mercurifera Argus, were aimed at avoiding dismissals resulting from the present crisis. However, production would have to be cut back to lighten the burden of large stocks which, at the current rate of demand, were estimated to cover sales for the next five or six years.

The Confederation urges the government to abolish the manufacturing tax of 32,000 lire per flask imposed some years ago. In this connection it is pointed out that, in the past, Italy had been one of the world's foremost producers and exporters of quicksilver. The manufacturing tax, it is alleged, is mainly responsible for action by the U.S. and Mexico to exploit hitherto unused deposits. This has caused output to advance and the world price to decline.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

The period of consolidation referred to last week has continued and there have been no significant price movements. Before any definite developments occur in the market situations, it will be necessary for the copper trade to make an assessment of the results likely to follow the Rhodesian copper strike now settled; for the tin trade to interpret whatever communiqué is issued, following the meeting of the International Tin Council now taking place; and for the lead and zinc trades to await the outcome of next week's meeting at Geneva on the question of the possibility of international action to help the prices of those two metals.

COPPER PRICE UNAFFECTED BY RETURN TO WORK

The copper market has remained very firm throughout the week and the news of the settlement of the Rhodesian strike had little effect, as it is generally realized that there is unlikely to be any easing in the price structure in the near future. Although the strike is over, it must be remembered that the pipeline to the U.K. and Europe is empty. It will be at least eight weeks before metal starts arriving again. During that time there may very well develop an acute shortage of metal which may result in the present large backwardation becoming even greater. The tendency to use up stocks was well indicated in this week's official stock figure which showed a decline of 1,624 tons from the previous week's level at a total of 6,610 tons.

A slight alleviation of the stock position will be brought about by the sale, by the U.K. Government, of 10,000 tons of copper from their stockpile between the middle of November and the end of January, especially as approximately 8,000 tons of this sale will be offered back to producers' agents who will undoubtedly use the metal to give to clients affected by the non-arrivals from Rhodesia and Canada. The market itself was unaffected by the announcement of this sale, as it had been expected that the tonnage would be nearer 25,000, being the balance of the 27,000 tons originally offered for sale in the middle of last year, and then withdrawn, from which 2,000 was released to help consumers at the time of the dock strike.

At the time of writing all the strikes in the copper industry are settled with the exception of that in Canada, and it is estimated that so far a total of some 80,000 tons of copper has been lost to the market, although a percentage of this loss will be made up over the next few months, as prior to the strikes, neither the mines nor the smelter at El Paso were working to full capacity. A loss of this magnitude, however, must have lasting effects and it will be several months before the markets return to normal.

News of the rate of consumption in America continues to be favourable, and it is now expected that, with the U.K. Government's latest financial measures, consumption in this country should pick up rapidly. More and more experts are beginning to think that consumption in Europe will also move into the upward swing again after the turn of the year. It would not, therefore, be surprising if the whole level of copper prices tends to rise during the foreseeable future.

TIN MAY GO HIGHER

The tin market has been quiet and featureless with a tendency for the backwardation to disappear, and it is not expected that there will be any major alteration in the situation until the International Tin Council's communique has been issued. If, as expected, the communique announces a policy of no change, then it is felt that prices will respond to the present statistical situation by rising a further £10 or £15, after which developments will depend upon the rate of increase in consumption brought about by recovering world trade.

Shipments of tin from Singapore in October totalled only 270 tons against 368 tons in September, shipments from Penang totalled 3,293 tons compared with 2,387 tons in September. Once again there was no sign of any metal coming to the London market as no shipments were made to the United Kingdom.

It was announced in London at the beginning of this week that under an agreement between the Republic of Indonesia and Brandeis, Goldschmidt & Co. Ltd., of London, which covers the treatment of tin concentrates, the sale of the resultant Bangka tin will be handled from the beginning of this month exclusively by Brandeis, Goldschmidt and Co. Ltd.

The Eastern price on Thursday morning was equivalent to £769¼ per ton c.i.f. Europe.

WAITING FOR GENEVA

The prices of lead and zinc have tended to separate again with the lead market developing strength whilst the zinc market has tended to fall back. The appreciable contango in the lead market has tended to disappear whilst the backwardation in the zinc market has been maintained. Attention is now concentrated upon the meeting in Geneva which starts on Monday but general opinion is that nothing concrete will result from its deliberations, although it is almost certain that an international study group will be set up.

From America, the Bureau of Customs announce that the lead bullion quota for "other countries" is now filled. This is the second quota to be filled, as it had already been reported that that for Belgium and Luxembourg was filled last week. The latest Bureau of Mines figures show that in August mine production dropped 10 per cent below the July level, whereas consumers used approximately 5 per cent more and stocks at consumer plants were reduced by some 3 per cent during the month, the output figure being 18,800 s.tons, the consumers usage 83,300 s.tons.

For zinc the smelter production of slab zinc fell by 3 per cent to 62,900 s.tons, whilst the consumption rose 10,000 tons to 69,000 tons. In Europe production of pig lead in September amounted to 47,136 tonnes, against only 36,332 tonnes in August. Output of refined zinc amounted to 67,042 tonnes against 65,567 tonnes in August. These production figures show that as compared with a year ago, the output of lead is approximately the same whilst the output of zinc is some 2 per cent less.

Closing prices are as follows:

	Oct. 30		Nov. 6	
	Buyers	*Sellers*	*Buyers*	*Sellers*
COPPER				
Cash	£246	£246¼	£259¼	£260
Three months	£236¼	£237	£244	£244¼
Settlement	£246¼		£260	
Week's turnover	12,600 tons		10,500 tons	
LEAD				
Current ½ month	£73⅜	£74	£75⅛	£75⅜
Three months	£74	£74⅛	£75⅜	£75½
Week's turnover	5,800 tons		6,800 tons	
TIN				
Cash	£749	£750	£758	£759
Three months	£746	£747	£756	£757
Settlement	£750		£759	
Week's turnover	670 tons		1,240 tons	
ZINC				
Current ½ month	£73⅛	£74⅛	£72⅛	£73
Three months	£71⅛	£71⅛	£71	£71⅛
Week's turnover	7,325 tons		6,950 tons	

London Metal and Ore prices appear on previous page.

Mining Finance

Mr. Gates and the Market for Wolfram

The wolfram market is highly volatile. From January, 1957, to September, 1958, the prices of copper, lead and zinc fell by 24, 39 and 36 per cent. During the same period, the price of wolfram fell by 72 per cent. If the fluctuations in this market seldom make the headlines, it is because wolfram is generally recovered as a by-product of another ore. To Beralt Tin and Wolfram, however, this is a matter of crucial importance. In fact, the difference between 330s. per unit, the average received by Beralt in the five years to September, 1957, and 70s., the current price, would reduce the company's income by £1,500,000 per annum on the average production of the past five years.

This was pointed out by Mr. F. Gates, the chairman of Beralt, at the annual meeting last week (extracts of which appear on page 515). He also pointed out, however, that this mercurial quality of wolfram works in both directions. The present difficulties, he believes, stem, like those of columbite, from the long-term high-price government contracts signed some years ago, and only now expiring. The inevitable result was that many new high-cost producers entered the market, thus preparing the ground for a severe price slump as soon as demand began to fall.

Most of these producers, said Mr. Gates, have now been forced out of business. Nevertheless, there remain offerings from Bolivia, where WO_3 is a by-product of tin, from Southern Korea, and of tungsten products from Iron Curtain countries, which together are ample to satisfy the present limited demand. Nevertheless, Beralt is an extremely low-cost producer, and a revival in the steel industries of the world from their present depressed output levels could quickly lift the wolfram price to a point at which the company could produce at a satisfactory profit.

Beralt's other competitive advantage is the flexibility of output as between tin and wolfram which is made possible by the nature of the deposits being exploited. At the moment, wolfram is being produced at the lowest rate consistent with contractual obligations — 100 tons monthly—while tin production is being expanded. This has necessitated the more rapid development of the section of the property known as Vale da Ermida, where the tin/wolfram ratio is more than three to one. In September, 1957, only 4 per cent of Beralt's labour was employed in this section. Now, 75 per cent of the force is mining there, and output has risen during the same period from 7 tons to 80 tons per month. Even at the depressed tin and wolfram prices ruling during the six months April-September, 1958, working costs were covered on this section—no mean achievement in view of the difficult nature of the ground—and costs themselves should be reduced when the Panasqueira mill is fully equipped to treat the whole of the section's output efficiently.

LONDON MARKET HIGHLIGHTS

Two unsettling factors dampened the rise in South African gold shares this week. In the first place there was a wave of selling from Johannesburg of Free State Saaiplaas. This was mostly in the form of maturing time bargains there; these deals allow a 60 days' run before settlement is due and the Cape operators had hoped that the period would have brought news of basal reef values in the No. 2 shaft. No values were released, however, and the resultant selling lowered Free State Saaiplaas 1s. 10½d. to 16s. 9d.

The market was also upset by criticism of the recent speech by Dr. Louw in South Africa. He was alleged to have told Afrikaans businessmen that unless Afrikaners got a better share in the control of industry, mining and finance, they might resort to nationalization. Dr. Louw later denied that he was an advocate of nationalization in any field where private enterprise showed itself willing and capable of doing the job. He claimed that he had been mis-reported. However, the damage, from a sharemarket angle, had already been done; and coupled with the Saaiplaas selling, it checked the rise that might have followed the excellent October profit returns from the newer mines and the new record profit figure for South African gold and uranium producers in the September quarter.

Previously, Harmony (38s.) had been a firm feature in anticipation of the peak profits announced for last month. Investment demand for Doornfontein (28s. 3d.) was stimulated by the chairman's forecast of higher dividends. Similar hopes lifted Rand Selection at one time to 45s. Meanwhile, a strong revival of Cape demand for "Freddies" (7s.) and "Johnnies" (51s. 3d.) gave rise to more talk that further news regarding the Western Areas project might be forthcoming at this month's meeting of "Johnnies". Otherwise H.E. Proprietary strengthened steadily to 14s. 6d. on a persistent demand.

South African coal shares responded to the fulfilment of hopes that the permitted maximum coal prices would be raised. Transvaal and Delagoa Bay (9½) and Tweefontein United Collieries (56s. 3d.) both moved ahead.

Diamonds improved, "Casts" rising to 17s. 3d. on final dividend anticipations and De Beers to 116s. 10½d. on brighter U.S. business news.

Coppers again fluctuated. For a while the market was content to follow in the wake of the rising metal price. Later, there were second thoughts about the loss of earnings resulting from the Copperbelt strike. Prices subsequently moved higher again when the strikers returned to work and the metal price went higher still. Outstanding were Chartered (73s. 3d.). In the speculative category, Rhodesia-Katanga improved to 16s. 7½d. on growing hopes that a decision to dewater the mine may be reached soon. Among other Rhodesians, Willoughby's fell sharply following the scrip issue which did not measure up to previous anticipations, but after touching 19s. 6d. they later rallied to 21s.

Lead-zincs were a fairly featureless market for the most part, but there was a steady improvement in tin share prices.

S.A. COAL ESTATES' CHANGED PLANS

Plans for opening up the Landau No. 4 colliery at South African Coal Estates (Witbank) were first announced towards the end of 1956. Only twelve months later it was revealed that the scheduled production date of the new mine had been deferred for one year—until mid-1960, in fact—in view of the then recession in demand. Now Mr. T. Coulter, chairman of S.A. Coal, has made it clear that the establishment of Landau No. 4 need not be considered for some considerable time to come.

The reason for this further postponement stems from the nature of the mine itself.

The old No. 3 colliery, whose output No. 4 was to replace, produces largely from the seam known as "Number Two". The calorific value of the coal in this measure varies, therefore, but in general increases from top to bottom of the seam. Hitherto, only the lowest 7 ft. have been saleable, and for this reason the upper part of the seam has been left *in situ*. During the past year, however, extensive investigations have been carried out on this coal, and it now appears that a saleable fuel can be produced by planned mixing and washing of the two portions of the seam. This has extended the life of Landau No. 3 by from 14 to 16 years, depending on future demand trends and No. 4 may not now be needed until the early 1970's.

As far as shareholders are concerned, the new plans will have little effect on distribution policy. Although the money set aside for Landau No. 4 will not now be needed for some time, the mixing and washing plant will absorb some £500,000. To replace this against the time when the new colliery will come into operation will obviously mean a continuation of present appropriation levels for some time.

Meanwhile, the industry's truck shortage continues, and 15 per cent of the Landau No. 3 output of 1,219,843 tons was despatched by road, compared with 21,761 tons in the previous year. As a result of this, and of other cost increases, the profit for the year was barely changed at almost £299,000, in spite of an overall increase in sales output, and dividends for the year are maintained at 3s. 9d. per share. However, Mr. Coulter's plea for a higher coal price was answered last week by an increase of 2s. 1d. per ton for Natal mines and 1s. 3d. for Transvaal and O.F.S. collieries, so that next year's results, assuming demand to be maintained, should show some advance. Next year's results, therefore, must almost certainly show an advance, since

the growing emphasis on industrialization in the Union, exemplified by the appointment of Dr. Diederichs as Minister of Economic Affairs, should ensure a steady increase in the demand for fuel for some time to come.

Mr. Coulter's statement appears on page 515.

NEWS OF THE LONRHO GROUP

An encouraging feature of the annual report of Cam and Motor Gold Mining, Rhodesia's largest gold producer, is the steady reduction in the rate of growth of costs. This is illustrated in the table:

Year to June 30	Sh. per ton	Increase
1955	43s. 6d.	—
1956	48s. 8d.	5s. 2d.
1957	51s. 1d.	2s. 5d.
1958	52s. 4d.	1s. 3d.

Development during the year, however, was not sufficient to maintain ore reserves, and the tonnage at the end of the year, 1,251,300 tons, continued the downward trend of past years which has persisted in spite of the growing retreatment of old slimes. This state of affairs results largely from the low payability of the Cam and Motor Mine. Of 7,232 ft. sampled during the year, only 1,523 ft. (21 per cent) proved payable.

As far as development is concerned, interest at the mine is now centred on the new levels, 43-46. Little is as yet known about values at these depths, since development from the Tertiary "A" shaft, which has been deepened to serve the lower levels, had consisted only of station cutting, etc, by the year-end. It may be that the chairman of Cam and Motor, Sir Peter Bednall, will be able to announce some news at the annual meeting on December 3.

Meanwhile, the results for the year expressed in terms of profit showed some deterioration from last year's levels. Working profit from the Cam and Motor Mine amounted to £441,827, about £27,000 down from 1957. Pickstone earnings were similarly lower by £6,000 from the previous year's £51,951. This decline was reflected in net profits before tax, which fell from £416,216 to £382,054. Taxation, however, was 33 per cent lower at £27,307, so that the company was able to declare unchanged dividends totalling 40 p.c. for the year.

London and Rhodesian Mining and Land, who provide secretarial and consultant services for Cam and Motor, also published their annual accounts this week. Mining, however, is only one of many activities carried on by this company, which derives income from such varied sources as ranching, tobacco growing, and real estate dealing.

The year to June 30 was not a good one for this company, profit before tax was sharply reduced from £124,694 to £81,424, largely as a result of a decline in income in the agricultural and real estate categories. Taxation cushioned the fall, however, and net profit after tax was £44,496, only £4,600 below the 1957 figure. In spite of this, the dividend for the year was halved to 5 per cent, and a warning is given that earnings of 10 per cent are distinctly unlikely this year, too.

In order to take advantage of O.T.C. provisions when profits increase, Lonrho's portfolio, which is worth about £844,000, has been concentrated in the African Investment Trust, a London subsidiary. However, application for O.T.C. status is to be deferred for at least another year in view of the current earnings position.

The statement by Lonrho's chairman, Brigadier S. K. Thorburn, appears alongside.

OUTLOOK FOR NEW CENTRAL WITS

The annual report of New Central Witwatersrand Areas, one of the smaller holding companies of the Anglo American group, goes to confirm the opinion expressed previously in this column, that the shares of this company are unjustly neglected.

During the year the portfolio has been tidied up, and by the date of the chairman's review the holdings were as follows:

Buffelsfontein	22,000
St. Helena	10,000
Vaal Reefs	28,990
Ofsit	30,000
Rand Selection	6,000
General Mining	5,000
Writ	100,000

Conspicuous by their absence this year are the holdings in E.R.P.M., Randfontein, and West Wits. Other important changes are the reductions in the holdings of Rand Selection and the acquisition of an interest, albeit small, in General Mining. It is now the policy of the company to invest in other mining shares besides Kaffirs, and the proceeds of these realizations will be used in this way as opportunities present themselves.

Obviously the company is extremely soundly placed for growth, and substantial growth, at that. All three of the mines in the portfolio are extremely promising young producers, and the holding companies, with the exception of Rand Selection, are also predominantly interested in expanding mines.

On a conservative estimate of dividends yet to be received by New Central Wits during the current year, it would seem that dividend income for 1958/9 should amount to some £40,000. Probably some small profit will be made on share dealing, in view of the sale of the Ofsit shares since the year-end, so that income for distribution might total £35,000 after all expenses. This would be sufficient for a dividend of 4½d., giving a prospective yield at current prices of 6.5 per cent. When we first drew attention to this share, in November last year, the price was around 3s. 9d. By February the price had appreciated to 4s. 6d., and now the quotation stands at about 5s. 9d.—a 60 per cent appreciation in a year. Nevertheless, the income prospects of this small, but well-balanced portfolio, are such that the shares still look to be on the cheap side.

Inco Earnings Down Further.—Earnings of Inco in the third quarter of 1958 were 61 c. per common share. This compares with 63 c. in the preceding quarter, and $1.40 a year ago. Total earnings for the first nine months are $2.07 against $4.52 in the same period of 1957.

Corner House Investment.—Details of the offers by Corner House Investment to holders of some of the Rand's older mines are now available. Corner House shares will be issued at par, and the values of the mining companies' shares for the purpose of the exchange will be as follows: Modder B., 3s. 6d.; T.G.M.E., 7s. 3d.; Rose Deep, 13s. 6d.; New Modder, 2s. 6d. Authorized capital of C.H.I. is £2,000,000.

LONDON AND RHODESIAN MINING AND LAND COMPANY

BRIGADIER S. K. THORBURN'S STATEMENT

The annual general meeting of London and Rhodesian Mining and Land Company, Limited will be held on November 26 in London.

The following is an extract from the circulated statement of the chairman, **Brigadier S. K. Thorburn, O.B.E., M.C.:**

During the year under review, the Company traded for a profit of £76,920 as compared with £123,831 last year. From this profit must be deducted £35,388 in respect of taxation, leaving a net profit for the year of £41,532.

After various adjustments your Directors recommend the transfer to General Reserve of £25,000, as well as the payment of a dividend of 5 per cent.

Town Properties. We have certain valuable stands in Salisbury, and these are being developed as rapidly as possible. A contract has been entered into to build a Post Office Savings Bank for the Rhodesian Authorities at a cost of £246,000 on one of our sites. This will be completed by the middle of October, 1959, and from then onwards should be a substantial revenue earner.

Gold Mining. We have a mining organization centred in Salisbury which manages Cam & Motor — the largest mine in Southern Rhodesia — and two mines belonging to Coronation Syndicate, as well as the Mazoe mine which is almost a totally-owned subsidiary of your Company. All these mines are doing well and, although I cannot see largely increased profits from this source unless we discover something new, they should be a steady revenue earner in the future.

Ranching

Now with regard to the Company's ranching activities, the profits from which at £5,617 have shown a drastic decrease when compared with the previous year.

About four years ago, your Board realized that a new and progressive policy was necessary if your ranches were every to play their full part in bringing in their share of the Company's revenue. It was obvious that money would have to be spent on dams and fencing, and the breeding policy revised. This new policy was started some three years ago and a great deal of work has been done; we have in fact spent during that period £85,000 in developing the four ranches.

Having dealt with the development and reorganization of the ranches in more detail, the statement continued: We have now taken one further step in the reorganization of our ranches to make certain that our administration and supervision are maintained at the highest standard. We have come to an agreement with Willoughby's Consolidated Company Limited that they should take over the management of these ranches.

Now as to the future: I see little likelihood of an increase in profits or dividend next year but we are hoping that from then onwards the results of this reorganization should begin to bear fruit.

SOUTH AFRICAN COAL ESTATES (WITBANK) LIMITED

(Incorporated in the Union of South Africa)

MR. T. COULTER ON FUTURE MINING POLICY

The following are extracts from the statement by the chairman, **Mr. T. Coulter,** which has been circulated with the annual report and accounts :—

Accounts

The gross profit on coal mining was £403,330 which shows a small decrease of £2,898 compared with the previous year. Total revenue amounted to £431,044.

Deductions in respect of administration and London office expenses, and the loss of £4,540 on Clewer Township amounted to £20,849, leaving £410,195 to be carried to the appropriation account. Together with the unappropriated profit of £114,380 brought forward from 1957 the amount to be dealt with in this account was £524,575.

A provision of £111,345 was made for taxation after adjustment, £4,000 in respect of Directors' additional remuneration, £2,313 for the Pneumoconiosis net additional outstanding liability and £9,583 for capital expenditure incurred during the year.

In pursuance of the company's policy of providing for future capital expenditure, a further £100,000 was appropriated for this purpose.

After declaring unchanged dividends totalling 3s. 9d. per share, absorbing £187,500, the unappropriated profit carried to the balance sheet was £109,834.

Net current assets excluding investments and stores, amounted to £423,293 reflecting the growing strength of the company's cash position.

Operations

Sales of coal at 1,739,995 tons exceeded the previous year's output by by 49,403 tons.

Sales of steam coal from Landau No. 3 Mine increased by 31,974 tons and coking coal from Navigation Mine by 17,429 tons as compared with the previous year.

In addition to the above sales output, 160,420 tons of steam coal middlings, produced at Navigation were purchased by Iscor.

Navigation Mine : During the year agreement was reached with Witbank Colliery Limited, in terms of which your company acquired the right to mine No. 5 Seam on a small portion of the farm Witbank No. 61 situated contiguous with your company's mining property. The estimated extractable reserves in this lease area are of limited extent, but they are easily accessible from your company's existing No. 5 Seam Workings. The agreement with Witbank Colliery Limited provides for mining these reserves on a royalty basis.

As heretofore operations in No. 2 Seam where only the bottom 4 feet is extracted, remain difficult. Mining is conducted at this colliery on a single shift basis.

Landau No. 3 Mine : This mine operated normally throughout the year on double shift. Monthly outputs varied between a minimum of 91,406 tons in November 1957 and a maximum of 110,573 tons in May 1958.

The considerable increase which has taken place in the transport of coal by road was demonstrated by the fact that Landau No. 3 despatched by road 182,466 tons during the year, amounting to 15 per cent. of the total sales output, compared with 21,761 tons during the previous year.

Future Mining Policy

In my statements for the years 1956 and 1957, reference was made to the plans under consideration for the opening of Landau No. 4 Mine in the near future.

The necessity for planning this replacement pit was dictated by two factors, the diminishing reserves at Landau No. 3 Mine, and the inability of that mine to meet the anticipated rising demand for steam coal, based on estimates of future trade made in 1956.

As I indicated last year, however, the trend of demand has not increased at the rate calculated and the company's technical advisers have given further consideration to alternative policies.

At Landau No. 3 only the bottom 7 feet of the No. 2 Seam have been mined to date and the available reserves have always been estimated on this basis of extraction. The upper portion of the No. 2 Seam has hitherto not been mined owing to low calorific values and poor quality which did not meet our trade requirements.

During the past year, exhaustive investigations have been carried out to ascertain the tonnage reserves remaining in the upper portion of the seam, the quality of such coal and the extent to which quality could be economically improved by washing.

This examination is now approaching completion and preliminary results indicate that a satisfactory product can be produced by washing a mixture of the top and bottom portions of the seam.

Estimates naturally show a preponderance of top coal reserves, but with planned mixing of the two portions of the seam, combined with efficient preparation on the surface, the total available reserves should give Landau No. 3 a life of 14 to 16 years from present date, dependent on future output demands.

Under these circumstances and in view of the lower rate of increase in demand than anticipated it seems clear that the establishment of Landau No. 4 Mine need not be considered for some years to come, possibly not until the early 1970's.

To meet the change in mining policy at Landau No. 3, and at the same time to provide some additional output capacity from that colliery considerable expenditure will have to be faced in erecting a high capacity washing plant, sinking and equipping a new incline belt conveyor shaft and installing some underground mechanisation for the loading and transport of top coal.

These matters are now being examined by the company's technical advisers, and it is hoped that their recommendations and estimates of cost will be available to the board in 3 or 4 months' time when a final decision on future policy will be made.

In the meantime, rough estimates indicate that the reconstruction and expansion programme under consideration at Landau No. 3 should be completed at a cost of somewhat less than £500,000.

Funds set aside in this and previous years for the opening of Landau No. 4 will be available for this work and, in view of the company's strong cash position, it will not be necessary to take any special steps in regard to finance.

It will nevertheless remain the policy of your board to appropriate amounts against capital expenditure to be incurred eventually in establishing Landau No. 4.

General

Last year, reference was made to the necessity for an early improvement in the price of coal. Approaches have already been made to the Price Controller and the matter is now under consideration.

Demands for increased wages have been referred to a Conciliation Board.

BERALT TIN AND WOLFRAM

The 30th annual general meeting of Beralt Tin and Wolfram Ltd. was held on October 31 in London, E.C.

Mr. F. Gates, Chairman, presided.

The Chairman, in the course of his speech, said :—At our General Meeting last year I said that the average price realised over the previous five years for the Company's wolfram concentrates was about 330s per unit. The price now stands at about 70s per unit. With a concentrate containing 75 units of W03 per ton, which is our normal grade, this price difference represents a fall in sales value of nearly £1,000 per ton and a fall in net yield at the mine, after deducting export tax, of about £720 per ton. Even at our present reduced production of about 100 tons per month this involves a reduction in net annual income of about £860,000; on the average production during the last five years the reduction would have been about £1,500,000 per annum.

I may mention that, whereas the prices of copper, lead, and zinc fell between January 1, 1957, and September 1, 1958, by 24 per cent., 39 per cent., and 36 per cent. of their respective prices at the former date, the price of wolfram fell during the same period by no less than 72 per cent. The general fall in metal prices has caused difficulties for most producers of base metals, but, as the above figures show, their difficulties have been small compared with those which wolfram producers have had to face.

Thanks to the consistency of mineralization in our main mine and the steps that have been taken over the past years to introduce new methods and equipment calculated to reduce operating costs wherever possible, both underground and in our mills, our Company can operate successfully at much lower prices than most of its competitors. It is almost impossible, however, even for our Company, to produce wolfram profitably at the price of under 65s per unit to which the market recently fell, a price which is probably the lowest in terms of real

values since the Company was incorporated in 1927.

Nevertheless, we must remember that the volatility of the wolfram market can be just as marked when prices begin to rise as when they are falling, and a revival in the world's steel industries, now running at much below capacity, might well result in an increase in the wolfram price to a level at which our Company can produce at a satisfactory profit. I can assure you that our mine is in a position to respond immediately to any improvement in the demand for wolfram.

Expanding Production of Tin Concentrates

Having regard to the violent fluctuations to which the wolfram price is subject, it is clear that the Company's position would be strengthened if an increased production of tin concentrates at an economic cost could be secured, and I informed you last year that the Board had laid plans with that object.

Considerable progress has been made in carrying out those plans, particularly in the Vale da Ermida section of the property.

The work so far done at Vale da Ermida has established the existence of a large tonnage of ore containing more than three parts of tin to one of wolfram, and the over-all grade of this deposit, though much lower than the average grade of wolfram ore in our main mine, is nevertheless remarkably consistent.

During the six months April to September, 1958, the value of production from Vale da Ermida at the prices ruling during that period covered the working costs of the section and made a useful contribution to overheads and I have every hope that, when Panasqueira Mill is equipped to treat the whole of the production from Vale da Ermida efficiently, working costs will be substantially reduced.

I am confident, therefore, that, with some modest increase in the price of tin and the restoration of the wolfram price to a reasonable level, the Vale da Ermida section is capable of making a valuable contribution to the Company's future prosperity.

Argimela

I now come to Argimela, the tin bearing property some 27 miles distant by road from Panasqueira, which we own through a wholly-owned Portuguese subsidiary company known as E.M.A.L.

An extensive sampling programme has been carried out, but we cannot yet say with any degree of certainty at what tin price this property can be worked at a profit. The evidence so far available suggests that it contains a large tonnage of tin ore, the average grade of which, however, seems barely sufficient to justify a large-scale bulk operation.

There are, however, smaller blocks of higher grade which it may be possible to work profitably by other mining methods. Much more work is still required before the prospects of profitable operation of this mine can be accurately assessed.

I would like to express our sincere thanks to our Consulting Engineer, Mr. J. C. Allan, and to our General Manager in Portugal, Mr. G. A. Smith, and his staff, who have met with resolution and energy the many difficulties resulting from the severe fall in the price of the Company's chief product and the consequent switch of productive operations from the main mine to Vale da Ermida.

The report and accounts were adopted.

WITWATERSRAND NIGEL

MR. S. F. DENCH'S STATEMENT

The twenty-fifth annual general meeting of Witwatersrand Nigel, Ltd., will be held on December 11 in Johannesburg.

The following is the statement of the Chairman, **Mr. S. F. Dench,** to be circulated with the Report and Accounts for the year ended June 30, 1958:—

The tonnage milled during the year was 210,400 tons, which was slightly lower than for the previous year, but the grade of ore milled, which was 4.894 dwts. per ton, was 0.434 higher. Working costs, which were 53s. 11d. per ton milled, showed an increase of 5s. 9d. per ton, of which 4s. 10d. was accounted for by increased cost of development.

Development Results

The footage developed was increased to 18,494 feet, but the percentage of payability was appreciably lower at 22.9. The value of payable development was also lower at 301 inch-dwts. Development in the Houtpoort Section where a single pay shoot lying on a quartzite footwall in an erosion channel has been followed down for over 3½ miles along its length, continues to be most disappointing at depth and as a result, proved and potential ore reserves in this section have declined.

The Main Reef intersection at the bottom of No. 3 shaft, which I reported last year, has not proved to be of any consequence. It is considered, however, that further work is warranted to test the area and to arrive at the best policy for its exploitation in conjunction with the Poortje Section. On the Poortje (No. 7 Shaft) Section development results continue to be satisfactory and it is evident that the normal shoot system of the Far East Rand exists on that section of the Mine.

The estimated ore reserve at June 30, 1958, was 739,000 tons, averaging 4.7 dwts. per ton over a stoping width of 37 inches. This represents a decrease of 46,000 tons and a reduction in value of 0.4 dwts. As a result of this fall in value it has been necessary to lower the grade of ore to the mill during the current year, with a consequent slight reduction in monthly profits.

Profit and Dividend

The net profit for the year was £87,441, which was almost the same as for the previous year. No gold-mining taxation is payable by the Company for the present. Capital Expenditure amounted to £9,002, of which £4,551 was incurred on the provision of X-ray facilities for African workers, in accordance with the provisions of the Pneumoconiosis Act. The balance of the expenditure was mainly in connection with the commissioning of No. 3 Shaft. Your Company's interest in the Far East Rand Joint Native Hospital was disposed of during the year for £8,285. There was thus a net expenditure on capital account of £717. Certain additional items of plant to be obtained during the current year will entail an estimated expenditure of between £10,000 and £15,000.

After a short interval, due to the financing of No. 3 Shaft, dividend payments were resumed and Dividend No. 4 of 5% was declared payable to shareholders registered at June 30, 1958.

Mr. Hervey W. Jones joined the Board during the year to replace Mr. L. C. Walker, who had resigned and whose subsequent death I regret to record.

I have pleasure in expressing the Board's appreciation of the excellent services rendered during the past year by the Mine Manager, Mr. G. Abdinor, and also by Messrs. J. H. Morgan and J. C. Ferguson who have acted in that capacity since Mr. Abdinor's transfer to Head Office. I would also like to pay tribute to the efficient services rendered by the technical and administrative staffs at Head Office and London Office and the employees at the Mine.

Publications Received

Lithium and its Compounds are the subjects of a monograph by D. S. Laidler, which has been issued by the Royal Institute of Chemistry, 30 Russell Square, London, W.C.1. The author is research manager, Central Research Laboratories, Associated Lead Manufacturers Ltd. This very comprehensive survey covers ores, manufacturing processes, and the properties and uses of lithium metal, alloys and compounds.

*

Canada produces about 60 per cent of the world's asbestos, most of which occurs in the Eastern Townships of Quebec, the Cochrane district of Ontario, and the Cassiar district of north-western British Columbia. This information is given in Geological Survey Bulletin 1019-L, entitled *Selected Annotated Bibliography of Asbestos Resources in the United States and Canada*, published by the U.S. Department of the Interior. The authors of this paper, which contains references on the geology, mineralogy, and origin of asbestos resources, are Ruth Avery, Mary Conant, and Helen Weissenborn. The introduction includes a brief history of asbestos from early times, when it was mentioned in Roman literature, to the present day.

*

Compiled to meet the demand for information contained in early, out-of-print accounts, Memoir 284, of the Geological Survey of Canada, gives selected field reports of the Yukon Territory, and is compiled and annotated by H. S. Bostock. The report is published at $3 by the Canadian Department of Mines and Technical Surveys. It covers the years from 1898 to 1933, and includes first-hand accounts of the initial operations in mining camps. The volume is arranged chronologically with an introductory note summarizing the field work accomplished each year. There are 650 pp. and a geological map of the Yukon Territory.

*

The consolidated net price list and buying guide of Claude Lyons Ltd. gives in compact form brief technical details and net trade prices for the great majority of the company's products. The pamphlet comprises 24 pages, and sufficient information is given to enable the right device for a particular job to be determined.

THE CEMENTATION COMPANY LIMITED

INCREASED GROUP PROFITS

STATEMENT BY MR. A. R. NEELANDS

The thirty-eighth annual general meeting of The Cementation Company Limited will be held at Grosvenor House, Park Lane, London, W., on Tuesday, November 25, 1958.

The following is an extract from the Statement by the Chairman **Mr. A. R. Neelands**, circulated with the report and accounts.

Trading Profit before charging taxation, was £1,031,640 as compared with £932,698 for the previous year, an increase of £98,942.

Net profit of the Group, after providing for taxation, amounts to £471,884 compared with £352,817 last year, an increase of £119,067.

A policy of expanding activities abroad has given rise to an increase in overseas profits and a greater liabiiity to overseas taxation (1958: £452,462, 1957: £268,156). This increase in overseas taxation, however, has been less than proportionate to the increase in overseas profits. As a result of working more abroad through companies not liable to United Kingdom taxation on their profits unless remitted and in countries where the local rate of tax is less than that of the United Kingdom there is a reduction in the Group provision for taxation.

In the case of the Parent Company whose overseas profits are chargeable to U.K. taxation, double taxation relief whereby overseas taxation on profits earned abroad is allowed as a credit against U.K. taxation on those profits, has reduced the amount of U.K. Income Tax and Profits Tax payable to a figure considerably less than it would otherwise have been if all our work had been carried out in the United Kingdom.

As you are all aware, a Rights Issue was made in January this year of 4 million Ordinary Shares of 5s. each at a price of 6/3d. per share in the proportion of one new share for every two shares held, which was very substantially over-subscribed. The dividend proposed for the year to March 1958, will be paid on the new shares although we have not had the use of the money except for the last quarter of the year.

At the same time, we made an issue of £500,000 Unsecured Loan Stock placed privately.

Total capital including share capital, loan stock and reserves now amounts to £8 million compared with £3.6 million five years ago.

We propose to pay the same Dividend —12½%—as last year on the Ordinary Shares including the new capital which will absorb £215,625 against £143,750 last year.

Carry forward of Revenue Reserves and Undistributed Profits of the Group is increased to £1,396,044 and Capital Reserves are increased to £743,627.

I have every reason to feel confident of the future, subject to the usual reservations regarding the unforeseen.

There is a substantial improvement on last year's results; this I would point out is almost entirely independent of use of the new capital which was available for two months only, and in that period was only used to reduce Interest charges.

We have started this year well with a larger volume of work than usual and, although we have had some disappointments in the awarding of work, these have been no more than normal.

Parent Company Activities

In the British Isles competition for Civil Engineering construction work is very keen.

Overseas, India continues to be our main field of Civil Engineering activity. Durgapur, now in its second year, is up to schedule with over £4 million's worth of work completed since commencing on site in November, 1956.

The Geophysical Group of Companies

My expectations for the future of Geoprosco as expressed in last year's Report have been borne out by the results achieved.

Commonwealth Subsidiary Companies

For the South African Company, the year has been one of changing outlook and increasing scope of operations to face changing conditions. For the first time, over £½ million's worth of work has been undertaken for clients other than Mining Interests.

In Rhodesia, where our cementation and drilling activities have always been in demand, we have been awarded our first shaft sinking contract in that country by Mufulira Copper Mines.

The Cementation Company (Canada) Limited shows an improvement on last year's results and returns a profit.

CYPRUS
LEBANON
JAPAN
CHINA
HONG KONG
PHILIPPINES
INDONESIA
THAILAND
BURMA
MALAYA
PAKISTAN
CEYLON
INDIA
IRAQ
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For handling corrosive mine waters

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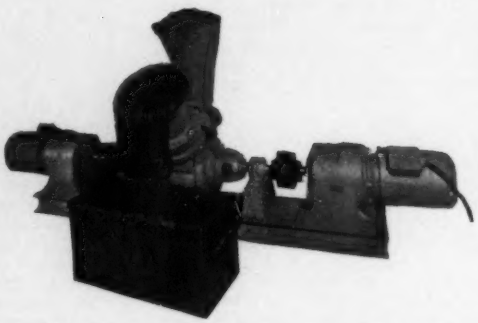

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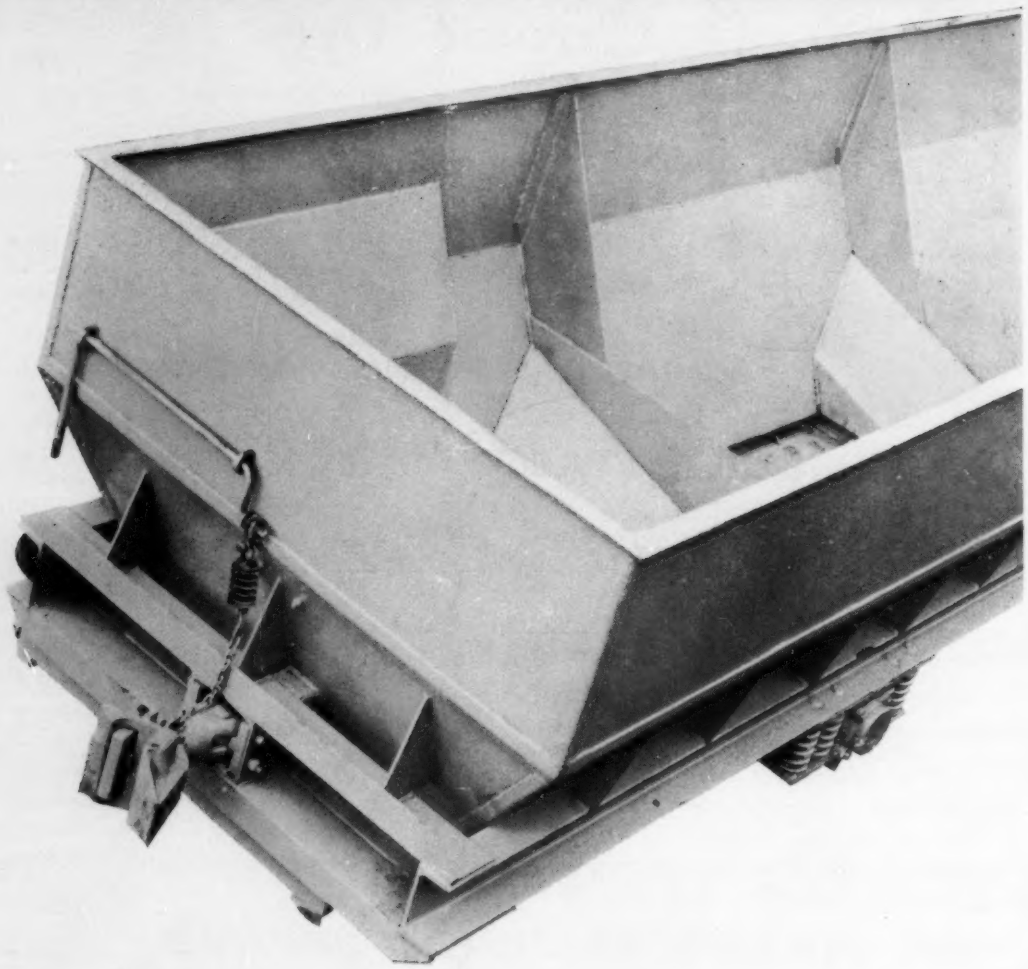

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